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THE AIR CONDITIONING, HEATING AND REFRIGERATION NEWS
THE INDUSTRY WEEKLY

Replacement patterns: Age of home heating systems across U.S.

Annual marketing guide to the indoor comfort and refrigeration industries — statistics and analyses

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STATISTICAL REF INDEX 1
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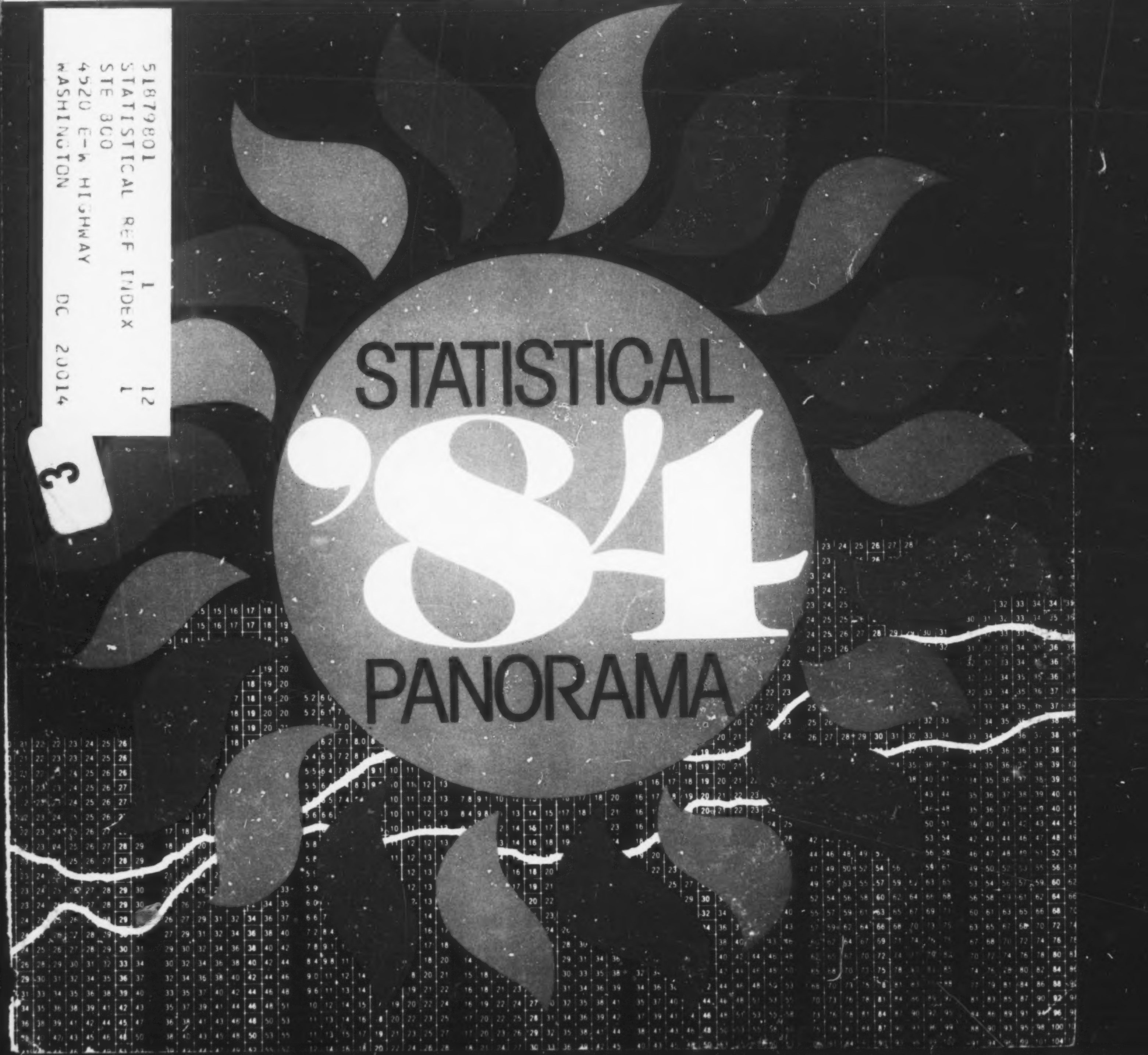

STATISTICAL '84 PANORAMA

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and ...

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The most advanced battery-operated leak detector you can buy. Fully automatic. Simply turn it on and pinpoint your leak. Even in contaminated areas. Its electronic beeping signal works like a geiger-counter.

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TAP INTO WEATHERKING WATER-TO-AIR HEAT PUMP PROFITS.

Where ground water is plentiful, you have a virtually untapped market for WeatherKing water source heat pumps. And a profit opportunity you can't afford to ignore.

Your Customers Enjoy Remarkable Energy Savings: Near constant ground water temperatures assure that the system uses less energy to maintain a year 'round comfortable temperature. WeatherKing WPH systems deliver SEER's as high as 11.7 cooling and COP's as high as 4.0 heating. Energy-wasting defrost cycles are totally eliminated.

WPH Works Almost Anywhere: In areas where ground water temperatures stay above 45° (over 75% of the U.S.A.), WPH units deliver low cost heating and cooling.
A specially designed YHP unit is available to handle areas with ground water temperatures down to 40°.

Standard Features:
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- Improved cooling. Higher SEER's.
- Field convertible for left or right hand air return.
- Corrosion resistant cupro-nickel condenser coil.
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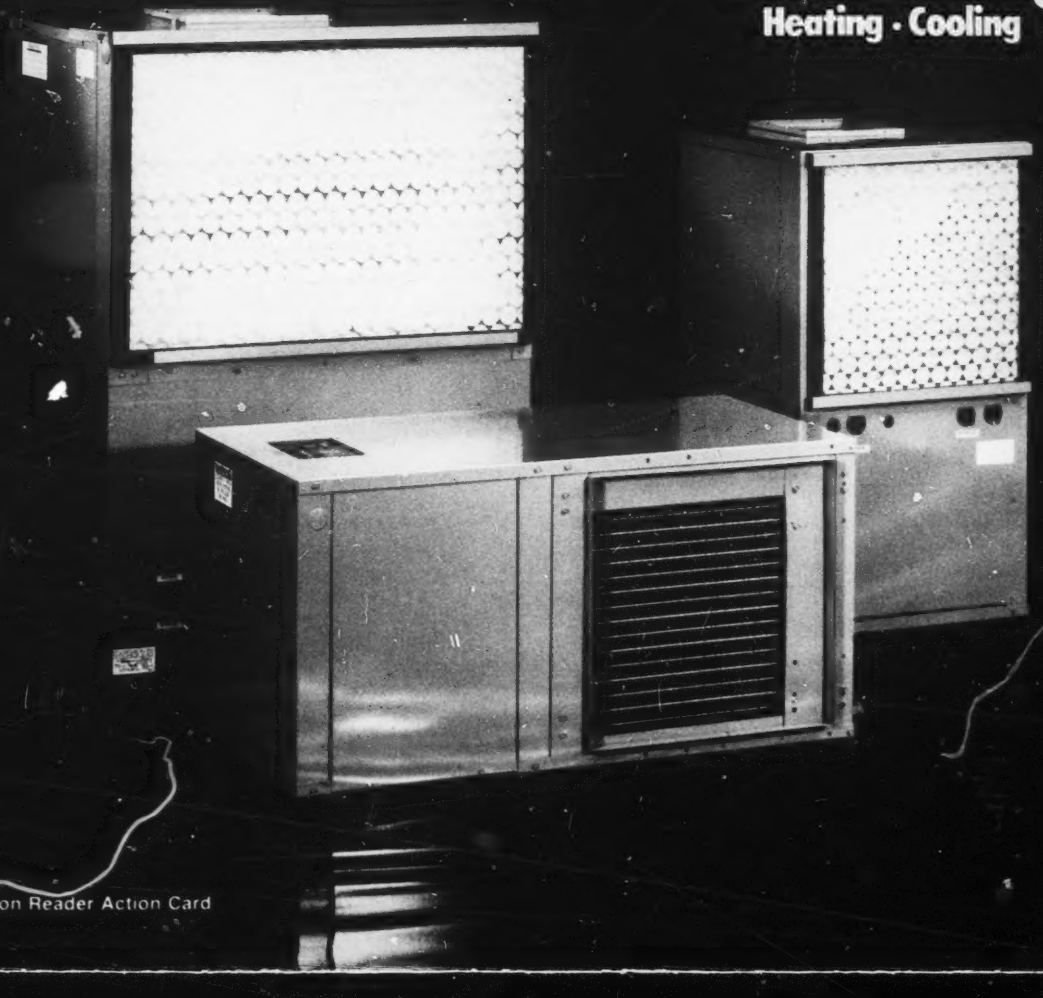
- Expansion valve control for precise superheat adjustment.

The standard **WPH** system also includes multi-speed direct drive blowers, specially-protected galvanized steel cabinets, insulated drain pans, lockout circuit and relay, high/low pressure safety controls, plus hermetic compressor with crankcase heat. Take advantage of a complete factory training and certification program, advertising assistance, and colorful consumer literature, to help you sell.

WeatherKing — A Name You Can Trust. WeatherKing, manufactured by Addison Products Co., means quality heating and cooling equipment backed by over 5 million units now in the field and over 30 years' experience.

For Detailed Information, contact the WeatherKing distributor nearest you. Call or write: Addison Products Company, 215 N. Talbot St., Addison, Michigan 49220. 517/547-6131.

WeatherKing
Heating · Cooling



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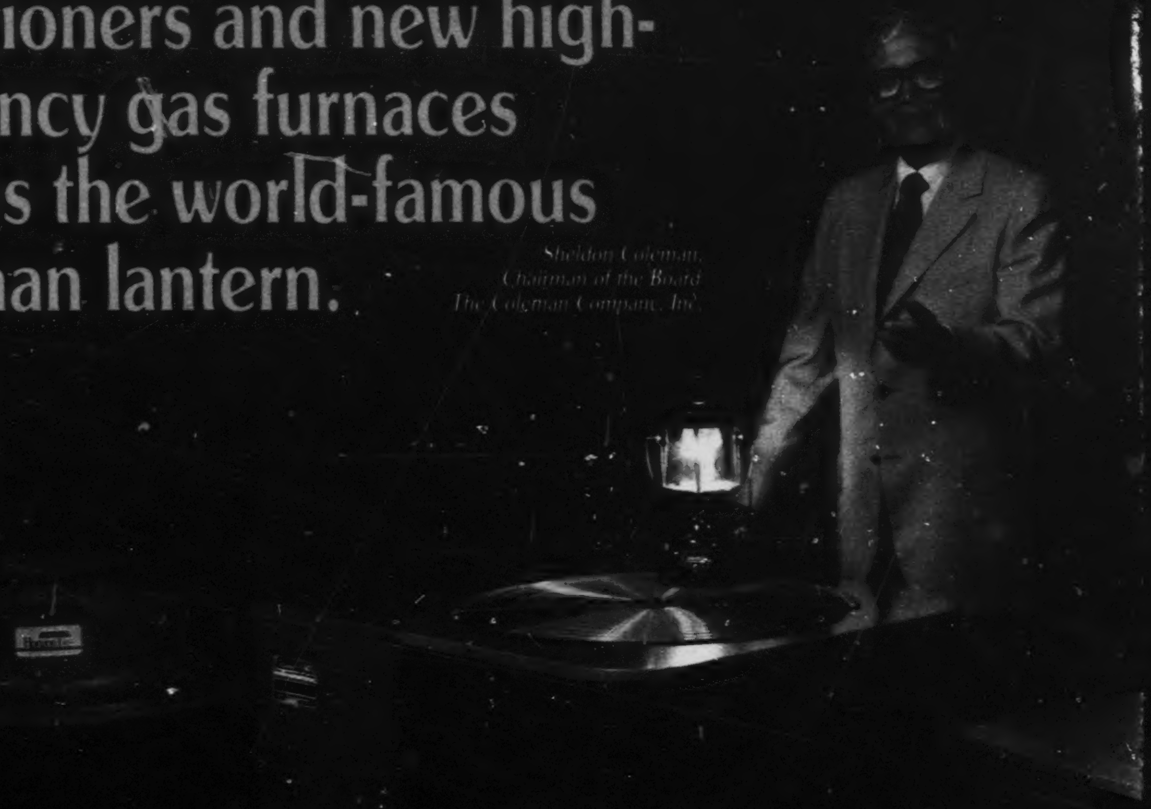
Sheldon Coleman is just as proud of his company's heat pumps, air conditioners and new high-efficiency gas furnaces as he is the world-famous Coleman lantern.



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Quality that can only cost you less in the long run.

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Coleman D.E.S. (Deluxe Energy Saver™) Gas Furnace — up to 82% efficient

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STATISTICAL PANORAMA

by Gordon D. Duffy and Thomas A. Mahoney

Forecasts

AIR CONDITIONING

Sparked by a strong housing market and hot weather, unitary air conditioner shipments rebounded by 43% last year. We're looking for a 7% increase to 2,850,000 units in 1984, on a par with the industry's best years, but it could be more. With more hot weather and continued lean inventories, unitary shipments could top 3 million this year.

HEAT PUMPS

Heat pumps, particularly in the South and West, have been a powerful force in the new home market. A slight slowdown in home building in these regions in 1984 should keep heat pump shipments to only about 7% more than last year's 629,776 units, or about 675,000 heat pumps.

FURNACES

Gas, oil, and electric furnace shipments rebounded by 48.2% last year, largely because of the housing recovery and a new market based on replacements for reasons of efficiency. We're looking for a 9.5% improvement, mostly in gas and oil furnaces, to 2,331,300 units in 1984.

BOILERS

Although residential boilers have not shared in the housing recovery to the extent of other equipment, a solid increase in Northeast housing starts plus continuing replacements for reasons of efficiency should produce an 8% increase in 1984 to 248,500 gas-, oil-, and solid fuel-fired boilers.

CHILLERS

A continuing drop in the office building market and the decision by at least one centrifugal manufacturer to build export units offshore in order to escape hard U.S. dollar penalties promises another 8% drop in chiller shipments to 10,000 units. This would be the third year in a row for declines of this magnitude.

ROOM AIR CONDITIONING

Room air conditioner shipments, which have declined over the past two years, should increase by about 20% this year to 2,400,000 units. This product has continued to be largely an impulse item. Potential growth at home is limited by the widespread acceptance of central comfort cooling and abroad by stiff Japanese competition and a hard U.S. dollar.

COMMERCIAL REFRIGERATION

The commercial refrigeration market continues on a rather stable path typical of a mature industry. The estimated 9.3% decline last year should be mostly made up in 1984 by a 6% climb to 95,400 units as supermarket construction and remodels start to benefit from the expansion in home building.

HOUSING

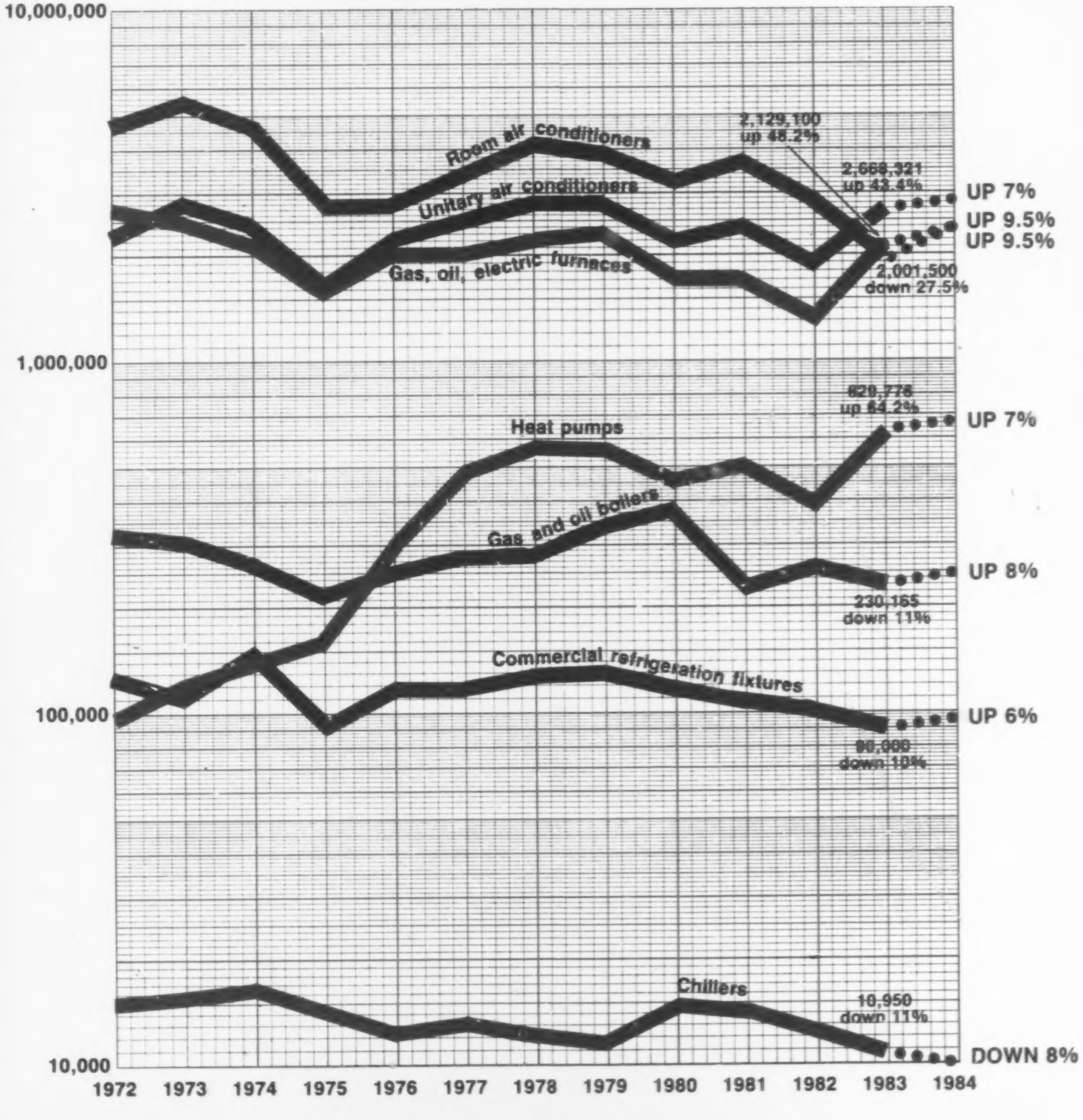
After being held down to Depression levels by high interest rates and tight money for two years, housing starts exploded in 1983 with a 60.3% increase to 1,703,100 units. Housing should continue strong throughout this year but the increase will be a more modest 7% to 1,825,000 units.

REPLACEMENTS

Not only have the markets born of the need to replace worn-out equipment increased steadily over the past four or five years, but significant new heating-cooling replacement markets have sprung up in the past couple of years. Homeowners who replace inefficient but otherwise healthy equipment in order to improve efficiency and so reduce energy costs have initiated important new sales opportunities for contractors.

BEST AVAILABLE COPY

Industry trends



1984 in perspective

Just as home construction took the lead in putting the nation's economy back on the road to recovery, the residential heating and air conditioning equipment markets are showing the way for the hvac and refrigeration industries.

The national economy, in recession since mid-1980, began to stir in late 1982 and, with the twin enemies of inflation and ultra-high interest rates under control, developed a surprising strength in 1983 that promises to carry forward throughout this year.

Housing responded with a 60% increase in starts, the fastest turnaround since 1946, and carried with it 43% increases in unitary air conditioner and gas furnace shipments. The level of housing starts and comfort conditioning shipments should hold last year's gains in 1984 — even gain a little.

But all markets did not share in the residential boom.

The large commercial market, still digesting the effects of the 1981 boom in office buildings, did well to hold even in dollar expenditures last year and may have to wait two years for another major upturn.

The industrial market was a disappointment in 1983 as manufacturers were slow to react to the turnaround in the economy. But improved profits, capacities now in the 80% range, and the urge to modernize to stay competitive should produce a strong industrial market through 1984 and 1985.

The light commercial market began its recovery in mid-1982 and came through with a modest gain last year. Those gains in new construction, a legacy of the strong housing recovery, will be bolstered this year with additional improvements in the replacement market.

The commercial refrigeration market, which sagged by 10% last year, should make up that deficit and more in 1984, partly because of the continued strength of housing and resulting new shopping centers, and partly because of an increased pace for remodels. Negative factors include declining exports because of the hard dollar and the fact that the supermarket industry is building fewer but larger stores, a trend that results in a net decrease in refrigeration fixtures.

The industrial refrigeration market held relatively steady throughout 1983 but is expected to share in the strong industrial expansion and renovation market that had its beginnings in the fourth quarter of last year and should last through 1985.

The 43.3% recovery of unitary air conditioner shipments last year to a total of 2,668,321 units, included a surprising 64.2% increase in heat pump shipments to 629,776 units. We say surprising because of the heat pump's growing penetration of the new home market in the face of increasingly stiff competition from gas furnaces.

Looking ahead, we see a comparatively small 7% increase in new home starts this year to 1,825,000 units. This has had a big influence on our somewhat conservative forecast of 2,850,000 unitary air conditioner shipments (including 675,000 air-to-air heat pumps), also a 7% increase over last year's levels.

The forecast, which would put 1984 on a par with the 2.8 million boom years of the past, is conservative for two reasons. First, consumer confidence and spending plans are unexpectedly high, which bodes well for the growing replacement-for-improved efficiency market.

More importantly, however, the industry's distribution system is showing real signs of improved efficiency brought on by improved forecasting techniques employed by wholesalers,

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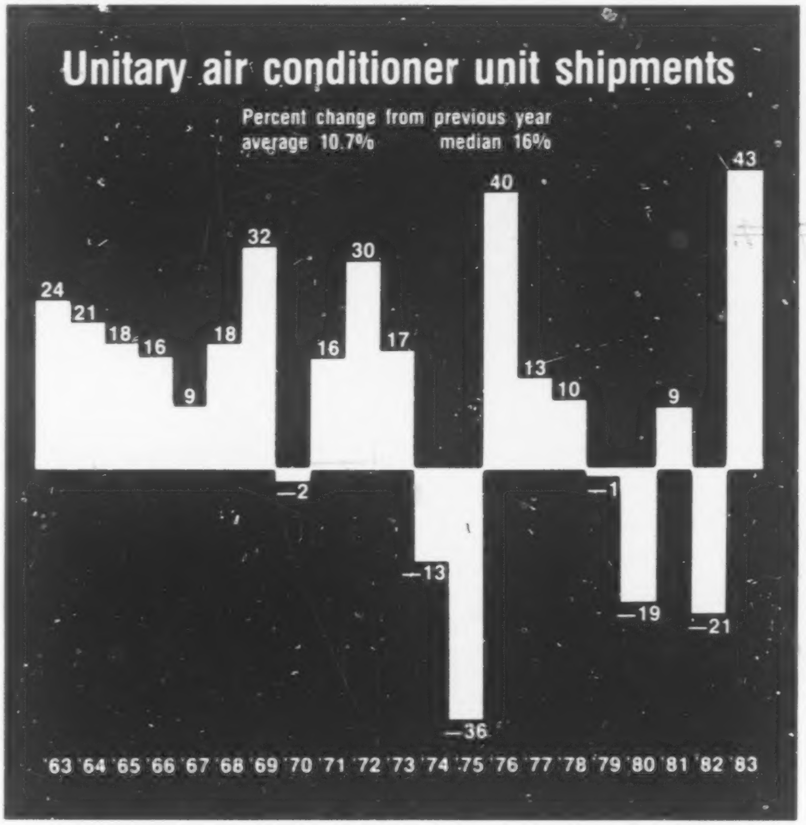


NEW MATH
FROM CARRIER:
PLUS EQUALS MINUS.

THE NEW 7 1/2-TON WEATHERMAKER

ANYTHING ELSE IN ITS SIZE.

IT ALL ADDS UP.

Here are the two most important things to know about our new 7½-ton Weathermaker One PLUS units. They are unsurpassed in efficiency of operation by any other Carrier rooftop unit and, that being the case, by any competitive unit as well. Their owning and operating cost is lower than any other 7½-ton unit we make. Ditto the competition. Seem impossible? Not at all. We put a lot more into our Weathermaker One PLUS units and that's why they work on less energy. The sum total is greater profitability for you, and the owner.

THE PRODUCT.

PLUS. Two products, really. Both with ultra-high efficiency. A 7½-ton rooftop packaged air conditioner with optional electric heat. And a 7½-ton gas/electric with our exclusive 4-pass turbo-tubular heat exchanger. The One PLUS offers the famous Weathermaker One dedicated downshot design air delivery for new construction jobs. It's also available with sideshot air delivery for replacement situations and still provides a smoother air flow with more external static pressure capability than most competitive units. In addition, both units have all the advantages of the Weathermaker One line. Plus higher EER's. Plus a serviceable semi-hermetic compressor. Plus 3 stages of cooling. Plus more coil. Plus fast payback.

THE PAYBACK.

PLUS. This is one of the biggest attractions of the One PLUS for the owner. He's buying a product that will cost him less to operate from day one. And after he's been reimbursed for the initial price difference, he's reimbursed for the entire cost of the unit, and his lower operating cost differential becomes, in effect, savings that continue through the lifetime of the unit.

UTILITIES LOVE IT.

PLUS. This is another argument in favor of buying the best there is. According to the ARI Directory (Jan 1 — June 83) the Weathermaker One PLUS is 12% to 22% more efficient than anything else on the market in its size. That makes it a sure candidate for utility rebates from Maine to Texas to California, a bonus that we haven't even included in our payback calculations or operating cost savings.

THE INVENTORY.

If you need a Weathermaker One PLUS quick, you've got it. Your nearest Carrier distributor will be able to get it fast. He's part of the largest HVAC distribution network in the nation.

CHEAPER TO RUN.

OPERATING COST COMPARISON (TYPICAL 2500 SQ. FT. BLDG.)

LOCATION	Chicago	Atlanta	Los Angeles	Houston	Miami
Fuel cost: Electric Natural Gas	$.0875/KwH $.433/Therm	$.0798/KwH $.638/Therm	$.0674/KwH $.5/Therm	$.0678/KwH $.56/Therm	$.0813/KwH $.768/Therm
Traditional Unit Yearly Operating Cost (Heating & Cooling)	$2,772	$2,747	$2,048	$2,268	$2,109
Weathermaker One Yearly Operating Cost (Heating & Cooling)	$2,569	$2,576	$1,864	$2,080	$1,939
Annual Savings	$ 203	$ 171	$ 184	$ 188	$ 170
Weathermaker One PLUS Yearly Operating Cost (Heating & Cooling)	$2,348	$2,319	$1,638	$1,839	$1,686
Annual Savings	$ 428	$ 428	$ 410	$ 429	$ 423

PLUS. Here's the story in dollars. By using one of our E20 II computer programs, we compared the yearly operating cost of the Weathermaker One PLUS against a Weathermaker One and against a traditional unit in 5 cities. You can see on the chart how much better the owner of a Weathermaker One makes out over the traditional unit. And the owner of the One PLUS is just that much further ahead. If you don't think that's convincing enough, ask your Carrier distributor to run an operating cost comparison of our Weathermaker One and whatever competitive unit you're proposing to replace. The Weathermaker One will look even better than it does on our chart here. And so will the Weathermaker One PLUS.

THE SEALS.

Every Weathermaker One PLUS is ARI certified. The packaged air conditioner is UL listed. The gas/electric has AGA approval plus. In fact, we've put the turbo-tubular commercial grade heat exchanger in our 7½-ton unit through a grueling cycling test of over 30,000 cycles — more than three times the number required by the AGA — with approximately five times the stress on the heat exchanger to prove it is commercial grade.

UL ARI 210 ARI 240 AGA

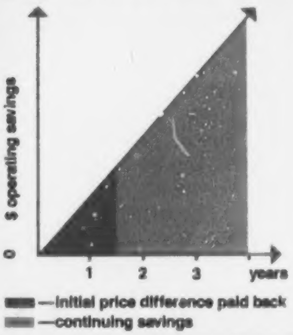
More rows of coil in the Weathermaker One Plus.

GGK

ONE PLUS COSTS LESS TO RUN THAN

THE SAVINGS.

Fixed energy cost (no inflation)



PLUS. Of course it costs more initially. But the Weathermaker One PLUS pays back its additional cost over other, less efficient, units in a little over one year's time. And the lower operating cost continues with the One PLUS paying entirely for itself well before its expected lifetime. After that, it's all savings.

COMPETITION.

THE DATA.

Model: 50CV008 (Downshot) Weathermaker One PLUS.
50CZ008 (Horizontal) Weathermaker One PLUS.

Type: Single Package Cooling Rooftop.

Capacity (Gross) Cooling: 95,200 BTUH

EER: 9.3

CFM Range: 2300 to 3750 Delivered Air.

Static Pressure: 1" W.C. E.S.P.

Refrigerant: R-22.

Unit Dimensions: 70¼" L x 68⁹⁄₁₆" W x 35⅛" H.

Unit Weight: 980 lbs.

Unit Color: Carrier Sea Spray Green.

Voltage: 208/230 Volt 3 Phase 60 Hertz.
460 Volt 3 Phase 60 Hertz.

Electric Heater Options: 50CV 6 Sizes 9.3 to 28.1 KW.
50CZ 3 Sizes 9.3 to 31.5 KW.

Maximum Duct Sizes:	**Supply**	**Return**
50CV	39¾" x 26⁹⁄₁₆"	39¾" x 26⁹⁄₁₆"
50CZ	14¾" x 25½"	26" x 25½"

Curb* Dimensions: 61¼" L x 57¼" W x 14" H.

*50CV008 only.

Model: 48LV008 (Low Heat Downshot) Weathermaker One PLUS.
48HV008 (High Heat Downshot) Weathermaker One PLUS.
48LZ008 (Low Heat Horizontal) Weathermaker One PLUS.
48HZ008 (High Heat Horizontal) Weathermaker One PLUS.

Type: Single Package Gas/Electric Rooftop.

Capacity (Gross) Cooling: 95,400 BTUH

Capacity Heating (Input): 48 LV/LZ 114,000 BTUH
48 HV/HZ 152,000 BTUH

EER: 9.2

CFM Range: 2300 to 3500 Delivered Air.

Static Pressure: 1.0"W.C. E.S.P.

Refrigerant: R-22.

Unit Dimensions: 88¹⁄₁₆" L x 68⁹⁄₁₆" W x 35⅛" H.

Unit Weight: 48 LV/LZ 1136 lbs.
48 HV/HZ 1140 lbs.

Unit Color: Carrier Sea Spray Green.

Voltages: 208/230 Volt 3 Phase 60 Hertz.
460 Volt 3 Phase 60 Hertz.

Maximum Duct Dimensions:	**Supply**	**Return**
48LV/HV	12¹¹⁄₁₆" x 56¼"	27" x 39¹³⁄₁₆"
48LZ/HZ	13¹⁵⁄₁₆" x 30⅞"	26" x 30⅞"

Curb* Dimensions: 77¹⁄₁₆" L x 57¼" W x 14" H.

*48LV008 & 48HV008 only.

ALL THE WEATHERMAKER ONE ADVANTAGES.

The Weathermaker One line, on the market just over a year, is a proven success. And the One PLUS has all of its advantages. The downshot PLUS has no plenum, allows duct work to connect directly to the curb, and offers the option of an easily-installed Economizer. The gas/electric One PLUS has a heat exchanger coated with Alumagard to virtually do away with corrosion. The sideshot packaged air conditioner and the gas/electric One PLUS units both have openings as closely sized to fit previous models as possible — for easy replacement. All One PLUS units share many of the same parts with the Weathermaker One line. And the entire refrigeration system benefits from computer-calculated balance between the unit's compressor, condenser, and evaporator.

THE ENGINEERING.

PLUS. The One PLUS offers higher efficiency because it offers more condenser and evaporator coil surface. This is determined by our exclusive Carrier-designed computer program. We've also added an additional condenser fan to reject heat faster. And so that we can provide even greater efficiency than ever, our Weathermaker One PLUS boasts the tried and true O6D semi-hermetic compressor featuring an unloader that allows two stages of cooling. Add to this an optional integrated economizer which accepts enthalpy control allowing up to 100% outside air and the Weathermaker One PLUS has a total of three stages of cooling. The first: the economizer. The second: unloaded compressor and economizer. The third: loaded compressor and economizer. The One PLUS is one of the few, if not the only, units of this size in the industry to offer this triple choice in cooling efficiency.

THE E.E.R.

9.3

PLUS. The 9.3 EER supports the Weathermaker One PLUS pac position as the highest efficiency 7½-ton unit on the market, with the gas/electric One PLUS immediately behind at 9.2 EER. What's even more interesting is the difference between the One PLUS and the EER of the next closest unit. It's not just a hair's breadth or even a few tenths of a point. It's an entire point in distance. Which means we're not just the best, but the best by a mile.

Find out more about the Weathermaker One Plus by calling your nearest Carrier distributor.
Or write to Carrier Corporation, P.O. Box 4808, Syracuse, N.Y. 13221.

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	San Diego	(619) 276-8582
	San Francisco	(415) 873-1660
	San Jose	(408) 971-8151
CT	Hartford	(203) 243-0361
	New Haven	(203) 795-6011
CO	Denver	(303) 761-5461
DE	Wilmington	(302) 762-2131
DC	Alexandria, VA	(703) 548-2045
FL	Clearwater	(813) 577-2222
	Ft. Myers	(813) 656-0500
	Jacksonville	(904) 737-0610
	Miami	(305) 652-4511
	Ocoee	(305) 656-1014
	Riviera Beach	(305) 845-7505
	Tallahassee	(904) 877-1196
GA	Atlanta	(404) 873-6311
	Macon	(912) 477-3193
	Savannah	(912) 355-0686
HI	Honolulu	(808) 847-6511
IL	Chicago	(312) 681-6220
	Peoria	(309) 637-0620
	Rockford	(608) 271-7500
IN	Evansville	(812) 426-9600
	Indianapolis	(317) 872-9543
	South Bend	(219) 259-6838
IA	Davenport	(319) 324-1954
	Des Moines	(515) 276-7757
KY	Louisville	(502) 491-9970
	Paducah	(502) 442-9116
KS	Salina	(913) 827-9306
	Wichita	(316) 265-4241
LA	New Orleans	(504) 733-8662
	Shreveport	(318) 227-2611
MD	Baltimore	(301) 866-6800
	Beltsville	(301) 937-0150
MA	Boston	(617) 322-8800
MI	Detroit	(313) 522-5000
	Grand Rapids	(616) 942-0670
MN	Bloomington	(612) 884-1981
MS	Jackson	(601) 354-8787
MO	Kansas City	(816) 471-1466
	St. Louis	(314) 535-4910
	Springfield	(417) 887-9387
NB	Omaha	(402) 334-7777
NV	Las Vegas	(702) 736-7786
NJ	Camden	(609) 365-2751
	Newark	(201) 227-9550
NM	Albuquerque	(505) 881-2929
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	New York City	(212) 392-9100
	Rochester	(716) 424-3140
	Schenectady	(518) 372-4751
	Syracuse	(315) 451-2660
NC	Charlotte	(704) 394-7311
	Greensboro	(919) 299-3131
	Raleigh	(919) 829-0155
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OH	Cincinnati	(513) 896-3800
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	Tulsa	(918) 622-5366
OR	Portland	(503) 620-1870
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	Philadelphia	(215) 879-7000
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	Dallas	(214) 258-0040
	El Paso	(915) 779-6100
	Fort Worth	(817) 731-0551
	Houston	(713) 869-3511
	Lubbock	(806) 797-4251
	San Antonio	(512) 824-7261
	Wichita Falls	(817) 723-7329
UT	Salt Lake City	(801) 972-4014
VA	Norfolk	(804) 857-6061
	Richmond	(804) 355-0651
	Roanoke	(703) 343-8054
WA	Bellevue	(206) 747-5911
	Spokane	(509) 326-1711
WV	Charleston	(304) 345-2385
WI	Green Bay	(414) 494-3139
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UNITED TECHNOLOGIES
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AIR CONDITIONING

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FROM PAGE 10

distributors, and manufacturers. Experience in 1984 should prove the point.

If the improvement in distribution efficiency holds up this year, it would mean that only a small portion of the 214,000-unit reduction in factory and field inventories at the end of 1983 will be made up in 1984. If so, the industry could experience the first three million-unit year in its history.

On the heating side, the residential boiler market dropped by 11.4% last year, primarily because hydronic systems have obtained a steadily shrinking share of the new home market. Increased housing starts in the Northeast, where hydronics still is strong, and replacements for the sake of improved efficiency should produce at least an 8% upward trend this year.

Electric furnace shipments, a victim of the housing recession because of their primary role as a back-up for air-to-air heat pumps, rebounded dramatically in 1983 with a 92% increase. Oil furnaces, on the other hand, barely held their own. We're looking for only a 5% increase for each this year.

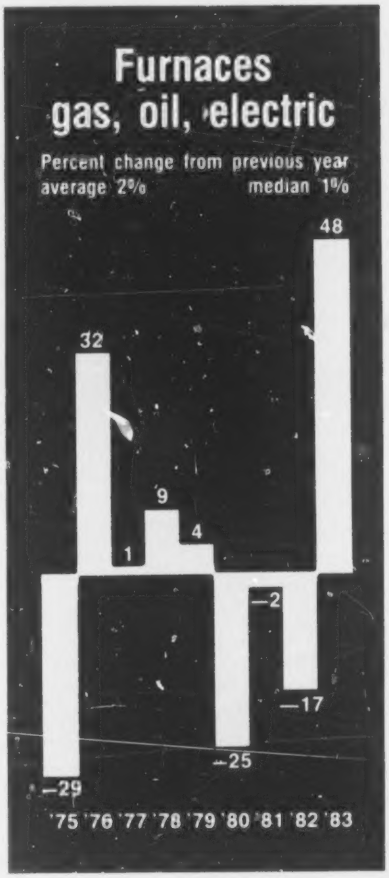
Largely because of the tremendous increase in new home starts, gas furnace shipments increased in 1983 by 43.8% to 1,661,765 units. But housing starts don't tell the whole story.

A new market has been evolving over the past two years which involves the replacement of healthy but inefficient gas furnaces with one of the wide choice of high-efficiency units that have entered the market. New technology has enabled home owners to reduce their fast-rising gas bills by making significant improvements in heating plant efficiencies.

We estimate that this market in two years already has grown to 15% of total gas furnace shipments, or 250,000 units last year. In 1984, it's possible this market could grow to 20% of shipments, or 365,000 furnaces.

For this reason, we have increased our forecast of gas furnace shipments to 1,825,000 or 10% better than in 1983.

The public's acceptance of high-efficiency gas furnaces is a logical extension of the earlier phenomenal acceptance of high-efficiency air conditioners, heat pumps, and oil burners.



Furnaces gas, oil, electric

Percent change from previous year
average 2% median 1%

We say phenomenal because higher efficiencies mean significantly higher equipment costs, yet the acceptance kept growing steadily despite more than two years of economic uncertainty.

In the case of oil burners, more than 80% of the burners shipped in the past few years have been retention-head or other high-efficiency types.

In the case of air conditioning, the Air-Conditioning and Refrigeration Institute (ARI) reported that through the first nine months of 1983, 83.7% of all residential unitary air conditioners (under 65,000 Btuh) shipped by U.S. manufacturers had an SEER (seasonal energy efficiency ratio) of 7.5 or more; 41.5% had SEER's of 8.5 or more; and 6.2% had SEER's of 9.5 or more.

Similarly, through the first nine months of 1983, 86.5% of air-to-air heat pumps with capacities of less than 65,000 Btuh shipped by U.S. manufacturers had SEER's in the cooling mode of 7.5 or more; and 19.1% had SEER's of 8.5 or more.

These figures contrast sharply with those of 1976, when only 23.4% of unitary air conditioners and 10.6% of heat pumps had EER's of 7.5 or more. Although regulators in some states with mandatory minimum efficiencies would like to believe otherwise, the regular upward progression of efficiency improvement from 1976 through 1983 reflects a widespread market-driven phenomenon that has little to do with government intervention.

Looking at the average EER's and SEER's (after 1980) for all unitary shipments, they moved steadily from 7.03 in 1976 to 8.31 in 1982 and 8.4 through the first nine months of 1983. For heat pumps, the averages climbed from 6.87 in 1976 to 7.97 in 1982 and 8.21 through the first nine months 1983.

A major factor in the acceptance of higher efficiencies for air conditioners and heat pumps has been the still-growing incentives offered by electric utilities who find it cheaper to pay homeowners to buy high-efficiency

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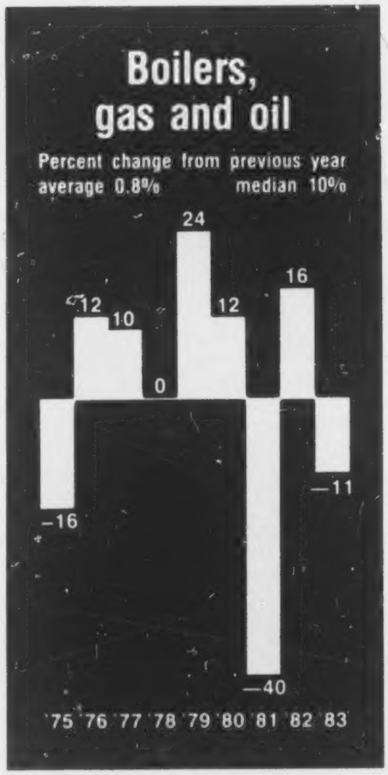
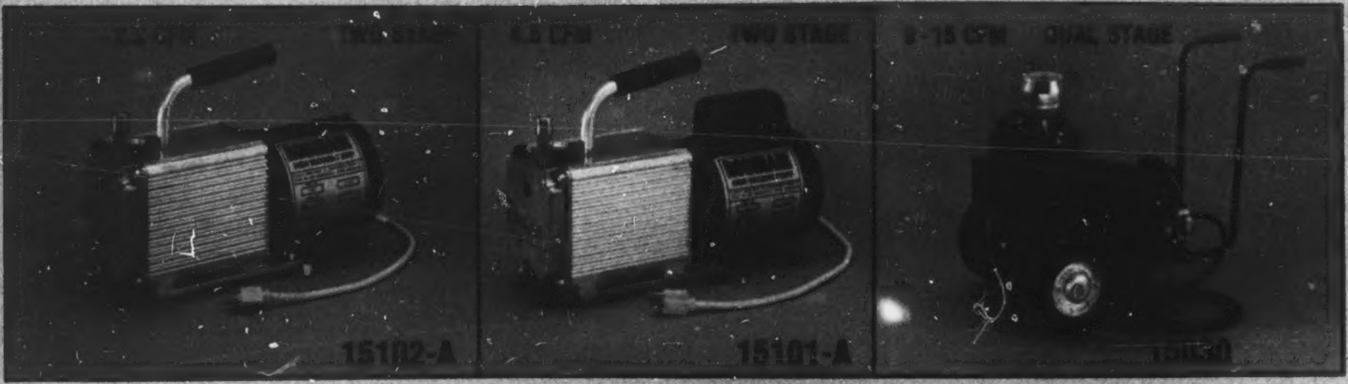
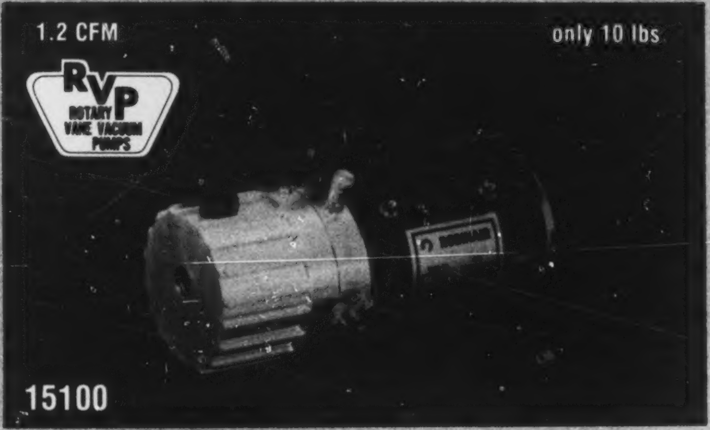


Boilers, gas and oil

Percent change from previous year
average 0.8% median 10%

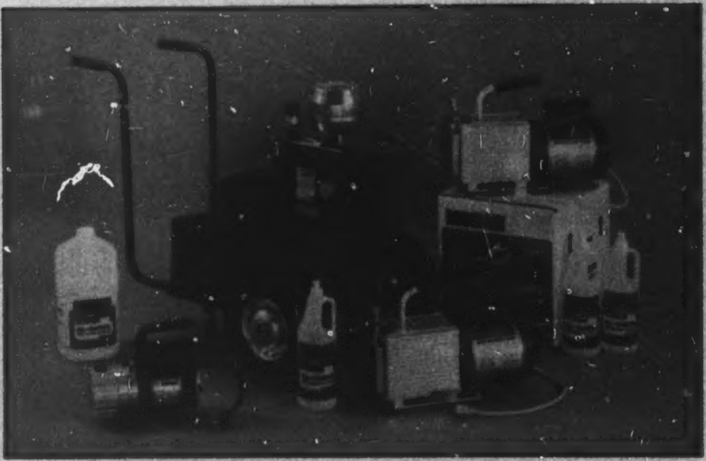
WHEN YOU NEED A HIGH VACUUM PUMP ROBINAIR HAS YOU COVERED





Robinair offers a complete line of top quality, full feature high vacuum pumps. Each pump is designed and built by Robinair to our own demanding standards. From 1.2 to 15 CFM, every Robinair high vacuum pump is engineered to give you years of reliable, honest service.

For 1984, Robinair is proud to introduce our new model 15100 high vacuum pump. This 10 lb., 1.2 CFM lightweight is rated at 200 microns and is every bit a Robinair pump. All of the benefits of gas ballast, rotary offset vanes and thermal motor protection are built into a lightweight workhorse—ideal for every appliance serviceman. Despite its rugged qualities, the new 15100 is the most affordable vacuum pump in the industry. The new 15100, like all Robinair pumps, is backed by a full year limited warranty. For further information contact Robinair Division, Sealed Power Corporation, Robinair Way, Montpelier, OH 43543-0193, Telephone 419-485-5561.



ROBINAIR

Circle 47 on Reader Action Card

THE LENNOX SPEC SHEET

HOW TECHNOLOGICAL INNOVATION KEEPS LENNOX AND YOU AHEAD OF THE COMPETITION.

Take a look inside the new Lennox split system heat pump.

You'll see how it can cut energy costs dramatically, and just as dramatically increase your profits.

Introducing the new HP17 Series split system heat pump. The most energy efficient heat pump in its category. And potentially the most profitable heat pump you can specify or sell in the light commercial market.

The secret to the incredible efficiency of the new HP17 is the exclusive Lennox designed and built twin compressor. Actually two compressors in one hermetic shell, this unique system allows part-load capacity modulation. So the new HP17 supplies the cooling needed during periods of reduced demand with only a fraction of the energy used at peak performance.

To prolong compressor life, there's solid state overload protection in the form of two internally-mounted temperature sensors that guard against high temperature damage.

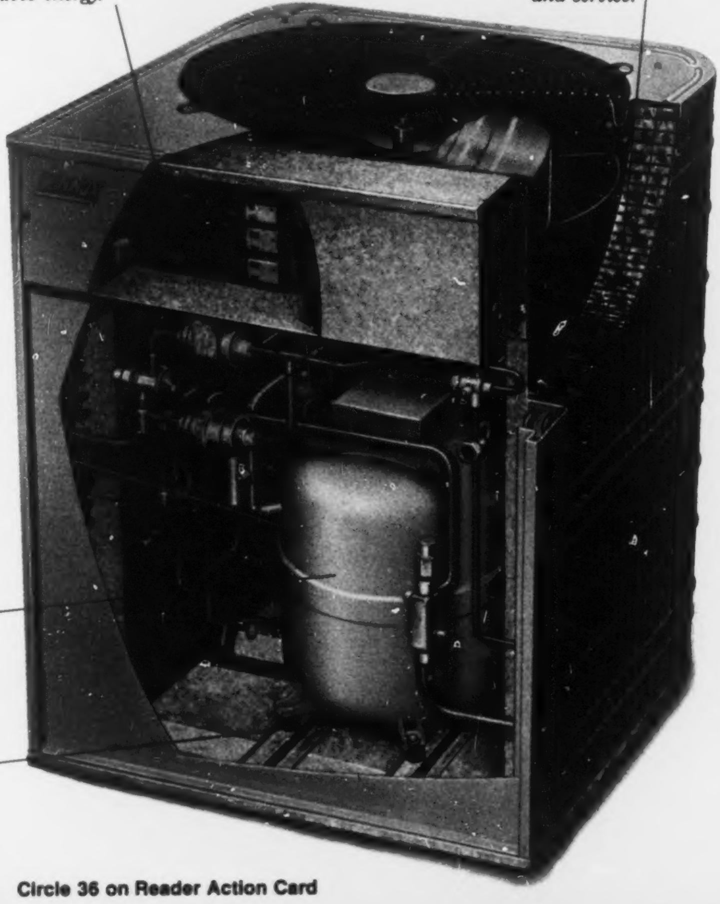
Whether positioned to your customers for upgrade or new construction use, the new Lennox split system heat pump can make a significant improvement in monthly commercial heating and cooling costs. In some cases, it can mean an additional 1% on bottom line profit by measurable reduction in overhead costs.

Of course, Lennox quality and reliability can add measurably to your own bottom line as well. You can guarantee your customers completely dependable performance and superior year-round comfort. Add in the highest SEER rating for this type of unit in the industry — a 10.0 — a choice of 7.5 or 10 ton capacity, and a competitive price, and the sale almost makes itself.

For more information on the new HP17 split system heat pump, call or write Lennox Industries Inc., Dept. 415, Lennox Center, P.O. Box 809000, Dallas, Texas 75380.

Once you read the full story on the new HP17, you'll say "Attaboy, Dave!" for sure!

LENNOX



***Time/temperature defrost control** guarantees efficient, reliable defrost cycle. Positive termination saves energy.*

***Reliable Lennox copper tubing** delivers efficient heat transfer. Durable, easy to work with and service.*

***Self-regulating internal crankcase heater** operates only when required. Saves energy. Prolongs heater life.*

***Spring mounted running gear** assembly and resilient rubber isolators mean quiet, vibration-free operation.*

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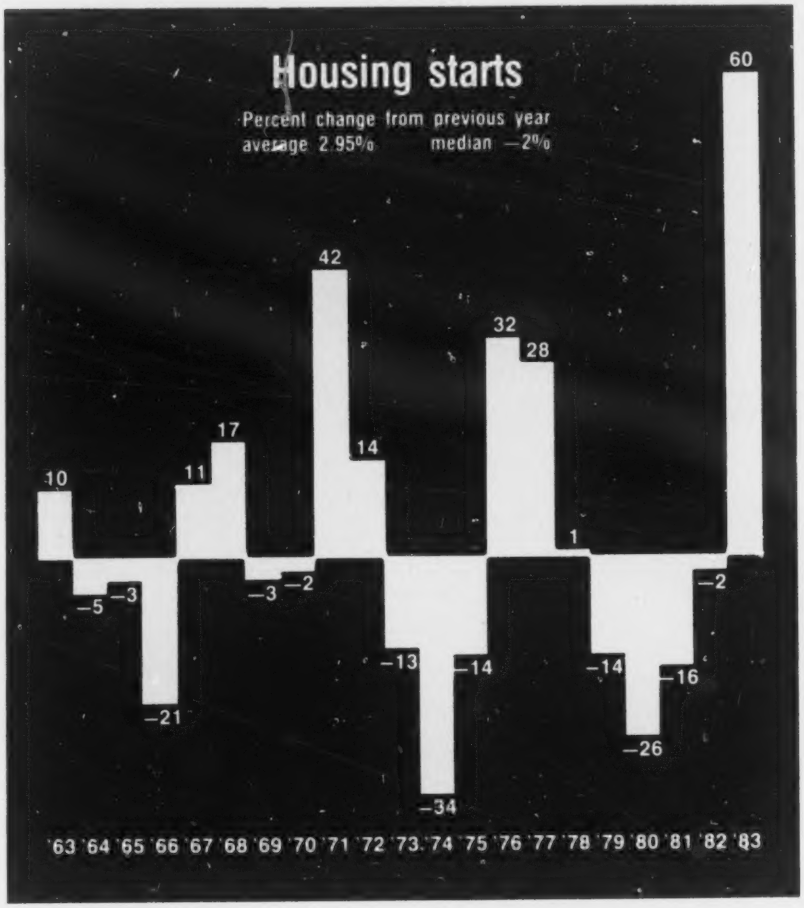

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equipment than to buy new generating facilities. And in 1983 we saw the first extensions of these incentives to commercial building owners.

Behind it all, however, have been the three- and four-fold increases in the basic fuel costs over the last decade. Homeowners, business, and industry have changed their attitudes about how they use energy.

In fact, it took 59,500 Btu to generate a constant dollar of gross national product (GNP) in 1973. But in the third quarter of 1983, it took only 46,400 Btu to generate a constant dollar of GNP, or 22% less. That, in gross terms, has been the net effect of energy conservation in the U.S. to date.

Looking at national residential fuel costs last year in relation to the year before, we find that the cost of No. 2 fuel oil dropped by 11.7%, natural gas prices increased by 5.7% (after a 27.5% increase in 1982), and electricity increased by only 3%.

From all indications, it would appear that fuel prices are in the process of stabilizing and show promise, over the next few years, of keeping step with overall inflation rates. In fact, the gas industry speculates that residential gas prices over the next 10 years will increase more slowly than the rate of inflation and, in combination with more efficient furnaces and boilers, present homeowners with the lowest operating cost option for the foreseeable future.

There is evidence, too, that the battle of the fuels, which went underground for a decade, already has erupted. Gas utilities are strongly resisting attempts by electric utilities to promote the use of split-system heat pumps on gas furnaces so that homeowners can get a fuel cost advantage during mild winter weather.

And in California, a sharp debate has developed over whether heat pumps deliver in practice what their ratings promise. This, in turn, has sparked a major American Gas Association field study of the relative performance of various systems, including heat pumps. And so it goes.

Overall, it was a better year for accessories. Both power humidifier and electronic air cleaner (eac) shipments showed modest increases in 1983 and expect increases this year. Power humidifier sales get an added boost from the sale of new and existing homes while increased attention to indoor air quality holds the potential to boost eac sales over the long term.

Regulation

Although federal minimum efficiency standards for residential heating and cooling equipment, which hung like a cloud over the industry from 1976 to 1981, were found to be unnecessary by the Department of Energy (DOE), state governments have other ideas.

In all, 23 of the 50 states have applied to DOE for exemption from the federal no-standard rule so that they can develop their own mandatory minimum standards. Decisions by DOE, along with decisions on pending court cases attacking the no-standard approach, are expected later this year.

It goes without saying that the prospect of nearly two dozen state minimums is upsetting to manufacturers, especially those with only one or two efficiency ranges. Because of the relatively large differences in metals used, the difference in cost for each 10th of an SEER can be large, thus presenting manufacturers who may be a few points above a particular state minimum with severe problems in a competitive market.

Still remaining are the energy labels and fact sheets mandated by the Federal Trade Commission for furnaces, boilers, room air conditioners, and other major appliances. Central air conditioners and heat pumps so far have escaped, primarily we suspect because General Accounting office studies have shown the labels and fact sheets are not being used by homeowners who buy central equipment.

In the wings, but not an immediate threat, is a continuing desire by some within DOE to mandate performance standards for all buildings, a project

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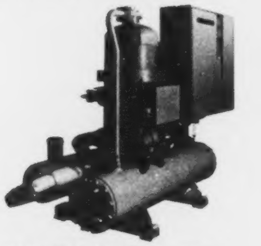
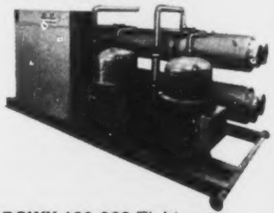
The Dunham-Bush difference in air conditioning.

One difference is the revolutionary rotary screw compressor. The "Advanced Generation" vertical screw compressor, for example, offers benefits not available in any other line. Benefits such as continuous capacity control, anti-friction roller bearings, internal oil separation and just three main moving parts—two rotors and the capacity control slide valve, all designed for lower operating costs, lower maintenance, lower downtime.

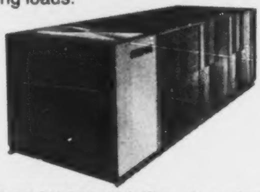
Plus a full line of products in a wide range of capacities. Packaged chillers, hydronic heat recovery systems, multiple source heat pump systems, compressor and condensing units, air cooled and evaporative condensers, shell and tube, and condensers with INNER-FIN® tubes, chillers, air handling units, multi-zone units, fan-coil units, comfort conditioners and water, steam and direct expansion coils, all part of the Dunham-Bush commitment to "uncompromising energy-efficiency" in air conditioning equipment.



PCWX 050-120 Five water cooled models in nominal capacities of 50 to 120 tons. Packages feature single vertical screw compressors and direct expansion chillers with INNER-FIN tubes. Complete control center. Compressor starters mounted and wired. All standard voltages; 60 and 50 Hz. For energy efficient, trouble-free air conditioning applications.

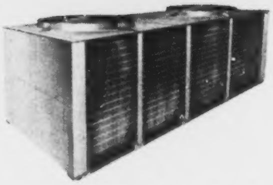


PCWX 180-360 Eight water cooled models—in nominal capacity range 180 to 360 tons. Multiple compressors, each with individual slide valve capacity control, provide the ultimate in energy efficient part-load performance. Units completely packaged, including compressor motor starters. Complete control center with single power connection. All standard voltages; 60 to 50 Hz. For those applications with varying air conditioning loads.

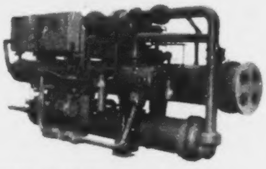


ARPCX 050-360 Five air cooled single compressor models range from 50 to 120 tons. One single and five multiple compressor models range from 120 to 360 tons. This latter group has a penthouse-style equipment room as an integral part of the unit. All units are completely prepackaged, including all interconnecting refrigerant piping. High capacity chiller with INNER-FIN tubes. Aluminum finned air cooled condenser for efficient head pressure control. All standard voltages, 60 and 50 Hz. Save on water and water disposal costs with these outdoor air-cooled air conditioning units.

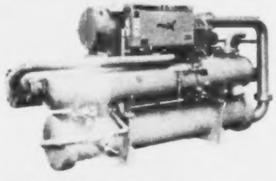
DDPCX 060-120 Four evaporative condenser models in nominal capacity range 60 to 120 tons offer the ultimate in energy conservation, lower operating and maintenance costs. Evaporative condenser coil is all nonferrous. Package includes single vertical screw compressor with slide valve capacity control, direct expansion chiller with INNER-FIN tubes, and all interconnecting piping. Electricals include all motor starting equipment plus complete control center. Suitable for either indoor or outdoor installation. All standard voltages; 60 and 50 Hz.



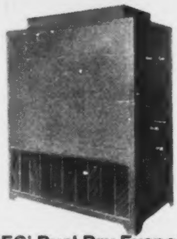
RCUX 050-360 Air cooled vertical screw compressor units from 50 to 360 tons. Single compressor to 120 tons. One, two or three compressors, dependent upon tonnage from 120 to 360 tons. Multiple compressor units provide the ultimate in energy savings. Single suction and liquid line connections for simple field installation. Finned condenser coil and separate subcooling. Penthouse-style equipment room standard on larger models.



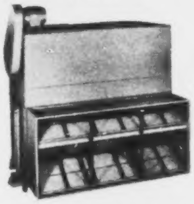
PCX-OHR These rotary screw heat reclaim packaged chillers are used in simultaneous heating and air conditioning applications. They feature open type screw compressors and heat reclaim double bundle shell and tube condensers to produce up to 150°F water for heating purposes. Capacities from 85-350 tons. Heating from 1.5-5.4 MMBH. Save on energy normally wasted.



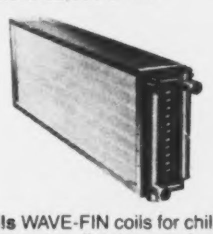
PCX-O Open type screw compressors and shell and tube water cooled condensers make these units ideal for heavy duty commercial air conditioning jobs. Capacities from 120-750 tons.*



'DDEC' Dual Dry Evaporative Condensers. These units are constructed to eliminate corrosion problems. Blow-thru design assures the fan remains dry; recirculating water is completely enclosed in a molded fiberglass envelope and does not come in contact with outer galvanized steel casing. Coils are prime surface copper. Operation is unusually quiet. Nominal tonnage 7½ to 200.



'AH' Air Handling Units. Optimum heat transfer, certified air flow, easy maintenance and ready adaptability to any air handling application makes these units a wise choice of engineer and contractor. 13 sizes for both horizontal and vertical applications. Certified WAVE FIN® coils, mixing boxes, face and by-pass dampers, filter and humidifier/eliminator sections are available. 1,200 to 32,000 CFM.



Coils WAVE-FIN coils for chilled or hot water, direct expansion or steam, feature staggered tube construction. Coils 8 or 12 fins per inch to 120 inch finned length.

DUNHAM-BUSH, INC.

175 South Street, West Hartford, Conn. 06110
One of The Signal Companies

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that was rejected by Congress in terms of the private building market. Not to be discouraged, DOE has recently issued a proposal to institute performance standards for federal buildings.

Also under development is a proposal to make now optional home and commercial energy audit programs mandatory on grounds that such a program could accomplish energy savings in five to seven years that would take 10 years to accomplish with normal market forces.

Construction values

Construction contracting volume in 1983 totaled $168.9 billion, up 7% from the $157.85-billion total for the previous year, according to the F.W. Dodge Division of McGraw-Hill Information Systems Co. When inflation of 4.7% is subtracted, the result is little real gain. Construction volume is forecast to reach $173.24 billion this year, a 2.6% increase or about half the expected construction inflation rate.

Nonresidential construction, at $49 billion in 1983, was 2% ahead of the 1982 total of $47.9 billion. A drop of 2% is expected this year, to $48.1 billion, primarily because of weaknesses in the office building and health facility markets.

The boom in new office buildings, which accounted for $19.2 billion in 1981, levelled off last year. Actually, the $18 billion in new office construction contracts last year was 3% ahead of the $17.4 billion total for 1982, but down slightly in terms of total square feet.

The outlook for 1984, however, is not so bright. A decline of 15% is forecast to $15.3 billion. Many of the top markets, such as Dallas and Houston, are overbuilt, but there are bright spots in the Northeast, California, Arizona, and Tennessee. The downward slide is expected to end next year, but the long climb upward will not be swift.

Light commercial construction, which increased 29% from $5.9 billion in 1982 to $7.6 billion last year, is expected to increase by another 10% this year to $8.35 billion.

The construction of hospitals and other medical facilities, which increased by 6% last year to $7 billion, is expected to decline by 5% in 1984 to $6.65 billion. Educational facilities, at $5.9 billion in 1982, increased by 2% to $6 billion last year and are expected to total $6.4 billion in 1984, or 7% ahead.

Industrial construction continued its downward spiral in 1983, when construction declined by 31% from $6.5 billion to $4.5 billion. A sharp turnaround is expected in mid-1984, which should boost the year's total by 11% to $5.4 billion.

The economy

Solid and controlled are probably the best adjectives to describe the turnaround in the economy that started in the first months of 1983 and promises to continue at about the same rate of expansion at least through the third quarter of 1984.

Led by home and auto sales, the strengthened economy has come about with surprisingly little inflationary impact and with an unexpectedly beneficial influence on unemployment rates. The industrial sector, now more comfortable with 80% plant loadings instead of 67% a little more than a year earlier, likely will move ahead with expansion plans in mid-1984.

The gross national product (GNP), in real terms, moved ahead by a solid 3.3% last year after a 1.9% decline in 1982. Expressed in current dollars, the GNP increased by 7.7% last year and by 4% in 1982.

Looking ahead, we can expect a growth in GNP in 1984 of about 4.5% in real terms, a bit better than last year because it will be more broadly based but not high enough to pose any real inflationary threat.

The biggest problem on the horizon, and the main reason interest rates still are much higher than they should be, is the federal budget deficit. It's all the more serious because, in an election year, it probably will be the subject of much confidence-destroying debate but little action. If no action is taken early in 1985, however, we can look for a general slowdown in the economy as confidence erodes and interest rates mount.

To put the money market in perspective — and explain why the prime interest rate stays at 11% when inflation is less than 4% — it must be remembered that, in the second quarter of 1983, the federal government was borrowing at an annual rate of $322.9 billion, or 50% of all the money raised in the nation's capital markets. When the borrowing of state and local governments (at an annual rate of $77.9 billion) is added, the government's share is 63%.

In the same time period, corporations were borrowing at an annual rate of $40.7 billion, or 6.4% of the total. Mortgage borrowing, at $150 billion, accounted for 23.6%. Corporations in 1983 were mostly using accumulated profits for expansion.

It's only a matter of time, then, before the needs of the federal deficit and the needs of industrial expansion collide, force interest rates up, and take the bloom off the nation's economic recovery. If nothing is done about the deficit, this collision could come before the end of 1984 but, most likely, it will come early in 1985. As a matter of interest, the federal government took only 2.9% out of capital markets in 1950 and only 9.2% in 1960.

It was the reduction in interest rates, both short- and long-term, that sparked the expansion in housing and auto sales in 1983 that, in turn, got the rest of the economy moving. Another major factor was the apparent stability of those rates.

The prime rate charged by banks, which ranged from 14.86% to 18.87% during the 1980-1982 period, dropped to 10.5% early in 1983 and, since that time, has held steady at 11%. Three-month treasury bills, which peaked at 14% in 1981, dropped to 7.8% early in 1983 and then stabilized at just under 9%. The discount rate at which banks can borrow from the Federal Reserve, which peaked at 13.4% in 1981, also dropped to 8.5% early in 1983 and stayed there.

Just as importantly, home mortgage rates dropped from a construction-freezing high of more than 17% to 15.75% in mid-1982 to the 13% to 13.5% range throughout most of 1983. Variable rate mortgages, which now constitute nearly 40% of mortgage loans, are being offered at 2.25% below the rate charged for fixed-rate mortgages.

We can look for both short- and long-term interest rates to continue on a stable footing throughout most of 1984. It would appear that housing, because of the increased reliance on variable rate mortgages, could stand a 14% fixed rate mortgage market for a few months without a significant shift downward. But not much more.

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One of the brightest stars on the 1983 economic performance chart was the 3.8% increase in the consumer price index. It came on the heels of a 3.9% increase in 1982 and was in sharp contrast to the 13.3% increase experienced in 1979 and the 12.4% rate a year later.

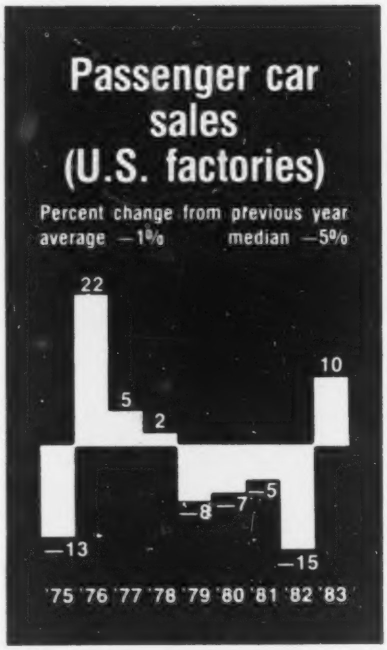
Looking across the components, it was clear that reduced energy expenditures, thanks to a mild 1982-1983 winter and a reduction in the world price of oil, were the main contributors to the low inflation rate in a year of economic expansion. Energy prices declined by 0.5% in 1983 — a sharp contrast to the 37.4% increase experienced in 1979, the year folllowing the last major world oil price increase.

Producer prices for finished goods in 1983 increased by only 0.6%. The increase in 1982 was 3.7% and 12.8% in 1979. As for 1984, we can expect consumer price increases to rise a bit but still stay close to the 5% mark, partly because of stable energy prices and partly because of continuing restraint in new labor contracts. The producer price index, for the same reasons, should not rise much above 3% this year.

Unemployment, which stood at 10.6% in December, 1982, dropped steadily — and unexpectedly — throughout 1983 and, in December, 1983, stood at a much-improved 8.1%. In January, it continued downward to 7.9%. We expect additional downward movement to about 7.4%. It might be noted that, in January, unemployment among Blacks still stood at 16.7% and 10.7% among women who maintain families.

Consumer per capita disposable income, at $9,968 in 1983, increased by 2.3% in terms of constant 1972 dollars over 1982 performance. Savings, as a percent of disposable income, declined from 5.8% in 1982 to 4.8% in 1983, an indicator of growing consumer confidence. Average weekly earnings, at $280.35 in 1983, represented a gain of 5% in current dollars and a gain of 2% in constant 1972 dollars.

On the international scene, the U.S. experienced a $4.8-billion deficit in the merchandise balance of trade (exports minus imports) in 1983, almost double the $2.65-billion deficit of 1982. The increase came despite a reduction in the imports of crude materials and fuels. Most of the difference can be attributed to a continuing decline in exports (from $17.7 billion to $16.7 billion) and an increase in foreign manufactured goods ($12 billion to $13.6 billion).



Closer to home, exports of air conditioning and refrigeration equipment totaled $1.57 billion last year, down sharply from the $2 billion in 1981 and $1.8 billion in 1982. At the same time, imported refrigeration and air conditioning equipment increased by 37% from $289.6 million in 1982 to $396.8 million last year — including 4.9 million compressors worth $194.2 million.

The 4.5% real growth rate forecast for the U.S. in 1984 is greater than the 2.5% seen for West Germany, 1.5% for France, 4% for Japan, and 2.6% for Russia. But doing better will be Saudi Arabia at 8% and South Korea at 7.5%.

On the inflation front, the expected 5% inflation in the U.S. this year contrasts with Italy's 14%, West Germany's 3.5%, Japan's 3.9%, France's 9.4%, Poland's 75%, Israel's 110%, Mexico's 48%, Brazil's 135%, and Argentina's 260%. Nigeria and South Africa both expect a real economic growth rate of between 2% and 2.5% and inflation rates of 14%.

The international debt question has quieted, at least until 1985 when default or rescue again will be a critical issue. Even though its ratio of debt service to exports was reduced from 52% in 1982 to 32% last year, Latin America remains the most vulnerable. In contrast, developing nations in Asia have a ratio of debt service to exports of only 10%.

Air conditioning

Just as the roller coaster performance of unitary air conditioner shipments since 1980 has been mostly due to what has been happening in the housing market, the dramatic 60% recovery in housing last year was a major factor in the equally dramatic recovery of unitary shipments.

Looking ahead, the continued strength of housing and a slow but steady improvement in the light commercial market could push unitary shipments this year to record levels.

Total shipments of U.S. unitary air conditioners and heat pumps in 1983 increased by a spectacular 43.4% to 2,668,321 units from the previous year's mediocre total of 1,861,243 units, according to the Air-Conditioning and Refrigeration Institute (ARI). The 1982 total reflected the result of two years when the housing market was at its lowest ebb since 1946.

These figures do not include air conditioning units and air-to-air heat pumps shipped to foreign markets in 1982. Although final figures were not available, shipments to overseas markets through the first 11 months last year were running 20% behind 1982 shipments. A recovery toward the end of the year should produce a 1983 total of 82,500 units, still 16% below the 1982 total of 98,300 units and about

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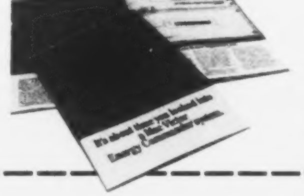
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25% below the industry average for the past decade.

It must be remembered also that these export figures include only those units shipped directly to overseas markets by oem's (original equipment manufacturers) and include few, if any, units shipped by distributors or contractors.

Of the 1,861,243 units shipped in 1982, about 78.7% — or 1,465,094 units — were for residential applications, and 21.3% — or 396,149 units — were for commercial applications, according to ARI. This is in line with the 78%-22% split that has held sway for the past decade.

The 1982 figures are, however, in sharp contrast to those posted in 1953, the first year for which statistics were available, when 66.9% of total unitary shipments went into commercial installations and only 33.1% were residential applications. The residential share passed the commercial portion two years later, when it accounted for 56.5% of shipments, and reached the 78%-22% split in 1973.

If we accept that the 1982 split held true in 1983, then 78.7% — or 2,099,969 units were destined for residential applications and 21.3% — or 568,352 units — were destined for commercial applications.

The unitary category includes electric air conditioners, gas air conditioners, air-to-air heat pumps, and rooftop equipment. It does not include packaged terminal air conditioners (ptac's), packaged terminal heat pumps, room air conditioners, heat pump water heaters, or water-source heat pumps.

Inventory

The inventory of unitary air conditioners at the end of 1983 was 693,350 units, or 26% of shipments last year. This is a dramatic change from the 630,000 units, or 34% of shipments, at the end of 1982 and considerably below the 30% to 33% range considered normal throughout the industry's history.

Although part of the nearly 214,000-unit difference between 1982 and 1983 inventory levels can be attributed to the hot summer of 1982 that emptied the pipeline significantly, the few complaints expressed in surveys conducted by The News, and in individual conversations, leads us to believe that most of the difference is due to a major distribution efficiency improvement among independent distributors and factory branches.

Another factor, of course, is that the sudden boom in new home construction also kept unitary equipment flowing through the industry's supply pipelines at a fast clip. But it would appear that efficiencies brought on by the relatively high cost of money and improved forecasting techniques employed by wholesalers, distributors, and manufacturers, had equally telling effect.

Of the total end-of-1983 inventory, an estimated 340,000 units, or 49%, were at the factory and 353,350 units, or 51%, were at the distributor level. This represents an increase of 46,000 units at the factory and 17,350 units at the distributor level when compared to prior-year experience.

Capacity mix

An indication of capacity mix for 1983 unitary air conditioners, and how it compares with 1972 experience, follows:

	% 1972	% 1983
Under 1.8 ton	16	14
1.8 ton to 26,999 Btu/h	23	21.9
2.25 ton to 32,999 Btu/h	17	18.2
2.75 ton to 38,999 Btu/h	22	20.4
3.25 ton to 43,999 Btu/h	6	7
3.67 ton to 53,999 Btu/h	7	7.3
4.5 ton to 64,999 Btu/h	6	7.2
5.4 ton to 96,999 Btu/h	1	1.7
8.1 ton and larger	1	2.3

Installed value

The installed value of unitary air conditioning equipment put in place in 1982, the latest year for which figures are available, was $5.204 billion, down 23.6% from the $6.811 billion worth installed in 1981, according to ARI.

Commercial installations accounted for $1.875 billion, or 36% of the total, and residential installed value was $3.328 billion, or 64% of the total in 1982, according to estimates compiled by ARI's Business Research Department from information supplied by manufacturers. The values for 1981 were $2.56 billion for commercial and $4.25 billion for residential.

Installed value covers the cost of unitary air conditioning equipment as shipped from the factory together with labor, ductwork, registers and grilles, thermostatic and other controls, electrical wiring, and other components of the system that are installed by contractors.

The installed value of field-engineered air conditioning systems put in place in 1982 was estimated at $3.605 billion, a decrease of only 1.7% from the 1981 figure of $3.669 billion.

The combination of the two installed value figures for 1982 was $8.809 billion for all comfort cooling, with the exception of room air conditioners, put in place in the U.S. This represents a 16% drop from the 1981 figure of $10.48 billion.

Comparing dollar values, unitary systems accounted for 59% of the total in 1982 and 65% of the total in 1981. Similarly, engineered systems accounted for 31% of the total in 1982 and 35% of total comfort cooling dollar expenditures in the preceding year.

In determining the installed value of field-engineered systems, ARI estimates that only 7.5% of the cost of the system is represented by the refrigerating machine. The remaining 92.5% represents air-handling equipment, labor, ducts, pipes, controls, and all other installation costs.

Ptac's

Packaged terminal air conditioner (ptac) shipments, which dropped sharply in 1980, have been increasing steadily ever since, primarily because of growing strength in heat pump versions.

Shipments in 1983 totaled 189,000 units, up 15.5% from the revised total of 163,600 units in 1982. Shipments in 1975 amounted to only 89,000 units.

The recovery of ptac's is a reflection of continuing strength in the suburban office park, nursing home, and hotel-motel markets in scattered areas of the country and of the growing strength of heat pump versions, particularly in the Sunbelt states.

The News estimates that heat pump ptac's accounted for 40% of total shipments in 1983, up from a third in 1982, and that heat pumps probably will equal straight cooling versions this year. In fact, ptac's without a reverse cycle have plateaued and even may have slipped a bit.

We believe that this market should do a bit better than hold its own this year, primarily on the strength of

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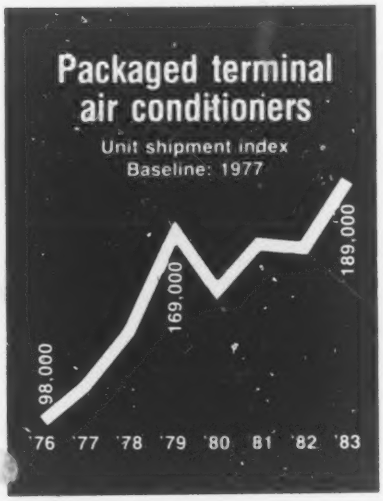

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heat pumps, and increase by 5% to 193,000 units.

It might be noted that the Bureau of the Census reported that 188,253 ptac's were shipped in 1982, the latest year for which figures are available, up 7% from the 175,866 units shipped in the previous year.

Of the 1982 total, the Census Bureau said 52,512 units in 1982 were heat pumps, or 28% of the total. Heat pumps accounted for 32,439 units in 1981, or 18.5% of the total. As can be seen, the Census Bureau figures vary considerably from those collected by industry.

Ptac's are self-contained refrigeration cycles capable of being combined with a heat source, usually electric resistance heat, steam, or hot water coils, in the same through-the-wall cabinet. The heat pump version uses outdoor air as a primary heat source and may or may not contain supplementary hydronic or electric resistance heat.

Heat pumps

Air-to-air heat pump shipments again demonstrated a close relationship to housing starts in 1983 when a 60% improvement in new home starts produced a corresponding 64.2% increase in heat pump shipments, from a dismal total of 383,515 units in 1982 to 629,776 units last year.

The total last year was a record for heat pumps, which rose from a plateau of about 120,000 units in 1973 to a previous peak of 560,000 units in 1978, thanks in large measure to natural gas curtailments. What has been disconcerting to the gas industry, however, is that the heat pump increased its share of the new home market when gas again became widely available.

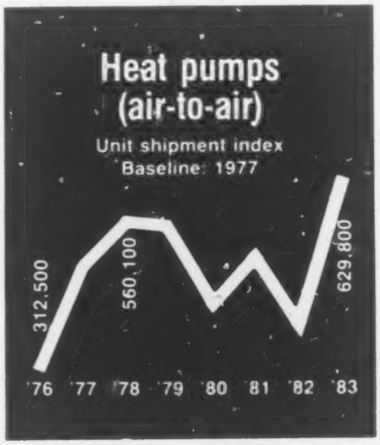
The drops in heat pump shipments in 1980 and again in 1982 were direct reflections of the depressed housing starts. But even then, the penetration of heat pumps into new single-family homes increased from 24.2% in 1981 to 26.6% in 1982 — and 28.5% of single-family homes built last year.

It should be noted, however, that the South in 1984 will represent a slightly smaller portion of total housing starts than in the past few years. This is offset, in part, by the modest growth in single-family homes expected this year. On balance, we are looking for a 7% increase in heat pump shipments this year to 675,000 units.

If there was a disappointment in the heat pump market, it was that the growth of add-on heat pump installations on existing gas and oil furnaces has been sluggish. It's largely a northern climate phenomenon. We estimate that the number of these installations last year was somewhere between 20,000 and 25,000 units.

The air-to-air heat pump figures included in the unitary figures supplied by ARI do not include all heat pumps made in the U.S. To these should be added ptac's in a heat pump configuration, water-source heat pumps (both earth-coupled and closed loop), air-to-water heat pump domestic hot water heaters, and room unit heat pumps.

The Association of Home Appliance Manufacturers (AHAM) does not break down its shipment figures into air conditioner and heat pump categories, nor does the Bureau of the Census. The News estimates the heat pump share to be in the order of 15% to 20%.



Water-source units

Water-source heat pump shipments, until five or six years ago, amounted to only about 40,000 units a year, mostly destined for the Deep South, primarily Florida.

But equipment and system design advances, together with a growing acceptance in the North, lead many to believe they may be at the bottom of a substantial growth curve. Certainly the continued growth of water-source units through a severe recession gives credence to that belief.

These units are not included in the unitary total (which includes only air-to-air units). Some are used on closed loops coupled to a small boiler and cooling tower to keep water temperatures between 60°F and 90°F; some use water from a well, pond, or the ocean at temperatures as low as 45°F; and others use closed vertical or horizontal ground loops filled with a heat transfer fluid (usually water and propylene glycol) to provide comfort heating and cooling at high efficiencies. It is this last application, which uses ground heat rather than ground water and can be applied in urban areas, which shows the most promise for growth.

Shipments of water-source heat pumps rose steadily from 40,000 units in 1977 to 95,000 units in 1981. Although shipments slipped by 7% in 1982 to 88,000 units, last year showed a 5.3% gain to 91,500 units. We are looking for a 12% increase this year to 102,500 units.

Heat-pump water heaters

The nation has traditionally heated its domestic hot water in natural gas-fired and electrically heated storage tanks.

A few are heated by LPG (liquefied petroleum gas) and oil. A few in the Northeast and Midwest use a water jacket on gas- and oil-fired boilers.

Increasing energy prices have motivated homeowners to add extra insulation to storage tanks, solar assist, and desuperheaters in areas where the operating hours of air conditioners and heat pumps can justify the cost.

The air-to-water heat pump, with an installation cost more than twice

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that of an electric water heater, entered the marketplace four years ago with the promise of operating cost savings in the order of 40% over electric resistance, gas, and oil in selected areas.

There were early hopes that heat-pump water heaters would rival the 2 million-plus shipments of electric domestic hot water heaters within five years, but that isn't happening. Although there are no statistics for the product, some feel that the 1983 market probably did not top 20,000 units.

There is no doubt, however, that the future of heat pumps generally is secure. Increased reliability and dramatic efficiency improvements in both air-to-air and water-to-air units have combined to provide a difficult moving target for competitive approaches. For example, in 1978 only 35% of heat pump shipments had an SEER (seasonal energy efficiency ratio) of 7.5 or more. In 1982, 83% had an SEER of 7.5 or more and 55% had an SEER of 8 or more. Penetration in new single-family housing (28.5% last year) continues to increase.

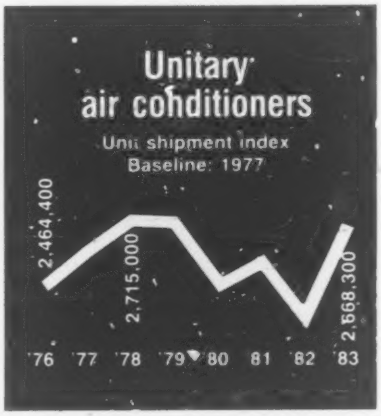
The heat pump now is a practical replacement for central air conditioners in many areas of the country for homes using any fuel. Even in natural gas areas, the heat pump can provide low-cost heating in the spring and fall seasons, allowing the gas furnace to operate on more efficient long cycles during the winter months.

Rooftops

Indications are that commercial rooftop shipments increased by 20% in 1983, reflecting the strength of both the replacement and residential markets. The reason we say "indications" is that no official sources attempt to classify rooftops.

Commercial rooftops really represent a market application of several different products rather than a single product type that can be identified statistically.

For example, all-year units are identified by both ARI and the Bureau of the Census and clearly imply a heating capability. However, both single-package and split-system rooftops, although they may have been shipped (and counted) as cooling-only units, may have a modular heating section added in the field.



Too, heat pumps imply one and usually two methods of heating as well as a cooling capability. Another complicating factor is that small, all-year rooftops are applied in more residential than commercial situations.

In the past, we have attempted to apply known ratios from the year-previous Bureau of the Census report to current ARI-supplied totals for the last complete year of shipment figures. These ratios were clouded, however, by the need to remove exports and other differences to make the two sets of figures agree as much as possible.

Recently The News was able to obtain a breakdown of ARI shipments by broad system types, by size, and by residential and commercial application. Although not as up to date as we would like, we find that the exercise produces a total consistently within 10% of the latest ARI figures by size of product.

By applying these ratios of ARI's 1983 shipment figures, we find there were 500,800 commercial units shipped in 1983, up 25.3% from the 399,800 commercial units shipped in the previous year. We also found that, in 1983:

- 216,000 were split systems, of which 51,800 had capacities in excess of 5 tons.
- 137,150 were all-year single packages, of which 31,150 had capacities in excess of 5 tons.
- 83,950 were cooling-only air conditioners, of which 23,100 had capacities in excess of 5 tons.
- 950 were multizones, all of which had capacities in excess of 5 tons.
- 62,750 were heat pumps — 50,200 split systems and 12,550 single packages — of which 9,700 units had capacities in excess of 5 tons.

Taken together, 116,700 were commercial rooftops with capacities in excess of 5 tons in 1983. The total is 20% more than the 97,075 commercial rooftops shipped in 1982. The stability of this market, credited primarily to growing replacement sales more than making up for new construction losses, can be shown by the 99,472 units shipped in 1980.

At least one manufacturer estimates that rooftop replacement sales in 1983 amounted to 34% of shipments and will approach 60% of shipments within five years — a development that promises steady, if unspectacular, growth for the foreseeable future.

Mobile air conditioning

According to Ward's Automotive Reports, there were 5,148,731 factory air conditioning units installed in U.S. domestic automobiles during the 1983 model year, up 13.7% from the 4,526,552 factory installations made in 1982.

The increase was greater than that for overall U.S. auto production, which increased by 10% from 5,616,069 units in the 1982 model year to 6,173,538 autos last year The difference can be accounted for by the increase in air conditioner penetration from 80.6% in 1982 to 83.4% last year. The penetration of factory installations was 73% in 1980.

For cars made in the U.S., virtually 100% of luxury and full-size autos are air conditioned at the factory. And, as can be seen from the penetration figures, most of the smaller-sized cars also now come equipped with comfort cooling since the easy availability of factory air conditioners in smaller sizes.

It might also be noted that 1,172,655 of the 2,135,984 light trucks produced by U.S. factories last year were factory air conditioned. That's an increase of 14.5% over the 1,024,996 air-conditioned light trucks in the 1982 model year. Light truck production increased by only 9.6% from 1,949,489 units in 1982.

Again, the reason for the larger air conditioner gain is an increase in penetration from 47.4% in 1982 to 54.9% last year.

Figures were not available for the penetration of factory air conditioning on cars imported into the U.S. in 1983. In 1982, a total of 417,812 of the 1,076,152 imports were air condition-

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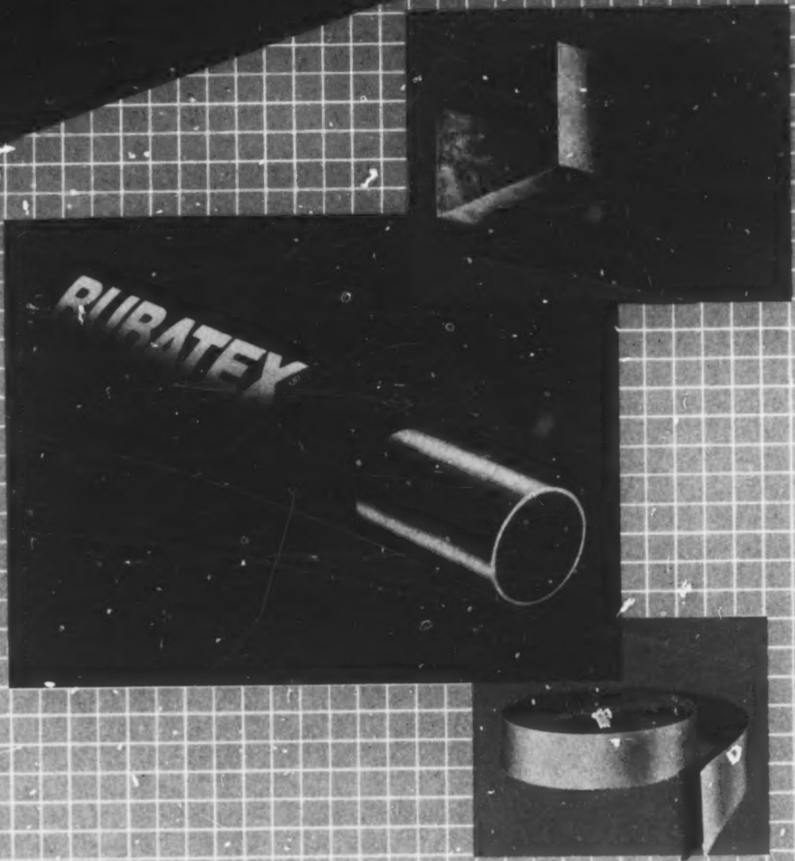

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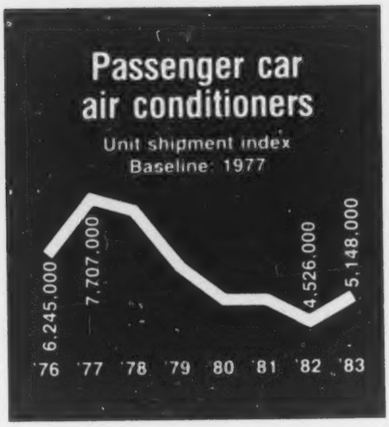

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ed, or 38.8%.

Aftermarket shipments of auto air conditioners have been in steady decline since 1978, primarily because of the increasing number of factory-installed units on imports, domestic cars, and off-highway vehicles. Although no official statistics are available, it is estimated that shipments have declined from about 1 million units in 1978 to less than 400,000 units last year. The market for farm equipment continues to be depressed.

Industry observers estimate that Japanese compressors, many of them built in two U.S. plants, are being used in more than 80% of aftermarket air conditioners produced in the U.S. There is also increasing application of Japanese expansion valves and other accessories.

Although 1983 figures are not available, the Bureau of the Census reported that 6,946,169 open-type automotive air conditioning compressors were shipped in 1982, down 7.2% from the 7,489,587 automotive compressors shipped in the previous year.

The Census Bureau also reported that 1,062,263 mobile air conditioners for trucks, agricultural and off-road construction vehicles were shipped in 1982, up 28% from the 834,174 units shipped the previous year. Similarly, the bureau reported 5,661,179 mobile air conditioning systems for passenger cars were shipped in 1982, down 6.6% from the 6,059,342 units shipped in 1981.

A two-year-old census category revealed that 142,164 recreational vehicle air conditioners were shipped in 1982, up 19% from the 119,566 units shipped in the previous year.

Room air conditioners

Room air conditioner shipments, which declined by 25% in 1982, dropped another 27.5% last year to 2,001,500 units. The total for 1982 was 2,760,600 units, on a par with 1975 but far below the 5 million-plus years of the early 1970's, according to the Association of Home Appliance Manufacturers (AHAM).

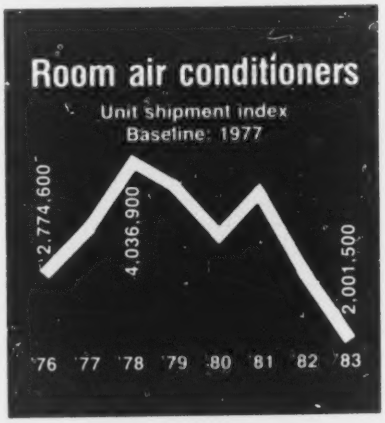
It's unlikely that those years of 5 million shipments ever will return. The Japanese succeeded the U.S. as the world's leading exporter of room air conditioners in 1981 and has added to that lead ever since, thanks to aggressive marketing, quality equipment, and a hard dollar that makes U.S. products more expensive abroad. (See also the "International" section for export figures and markets.)

Contrary to the expectations of some, high energy costs have not caused consumers in significant numbers to switch from central air conditioning to the more selective room unit approach. If anything, the reverse has been the case.

Room units, then, have remained essentially an impulse purchase influenced principally by hot weather. But the extended hot summer of 1983 did little to increase production. Instead, the increased room unit sales were taken mostly from inventory, and room units continued as the appliance industry's weak sister.

The shipment of 168,000 room air conditioners in January, an increase of 90% over shipments for the same period in 1983, led some to believe that room units are due for a big year in 1984. Most of the increase, we suspect, will go toward restoring depleted inventories.

But given a reasonably warm summer, we think it's reasonable to expect an increase of 20% in room air conditioner shipments this year, or 2,400,000 units, even if a good part of the increase would really be a reflection of last year's saies from inventory.



Chillers

Although total chiller shipments continued to decline by another 10.9% in 1983 to 10,950 units, it must be remembered that some abnormalities have crept into the numbers within the past few years that distort the picture the statistics portray. The total of 12,300 chillers reported for 1982 was, itself, a 10.8% decline from the previous year.

The 3,100 centrifugal chillers shipped in 1983, down 13.9% from the 3,600 shipped in 1982, represent the abnormality. For one thing, the figures have not included open-type centrifugals since 1982, an omission that probably could have added another 500 to 600 units to the total.

Another major factor is the shift of centrifugal production offshore to serve markets outside of North America. At least one major manufacturer has taken this course in an effort to avoid the hard dollar penalties of domestic production. Also, we suspect that quite a number of screw compressors used for air conditioning are included in the totals for centrifugals.

In 1983, there were 7,700 reciprocating chillers shipped, down 9.4% from the 8,500 reciprocating chillers shipped the previous year. Shipments of absorption chillers amounted to only 150 units last year, down 25% from the 200 units shipped in 1982. Again, almost half of the absorption units produced in the U.S. last year were exported.

Although 1983 figures are not available, the Bureau of the Census reported that 2,620 screw compressors were shipped in 1982. This is a much more reasonable figure than the 5,320 total listed for 1981 but it may be a few years yet before the figures for this category can be thought of as reliable.

The Census Bureau reported that 1,509 ammonia compressors were shipped in 1982, down 16.5% from the 1,808 total for 1981.

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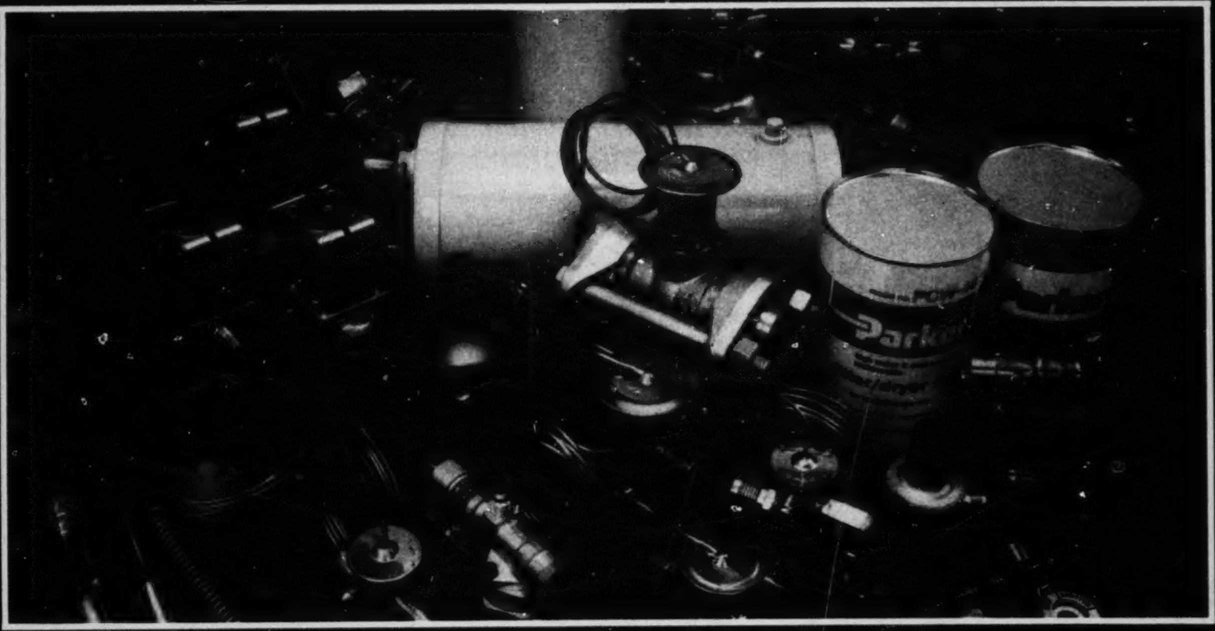
Parker. A major factor in the refrigeration & air conditioning flow control market.



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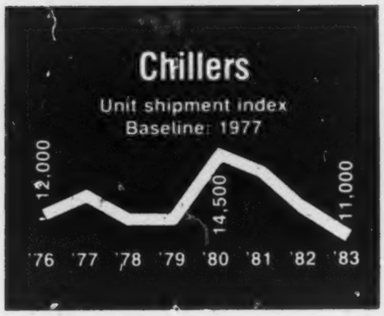

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The bureau also reported: 11,404 reciprocating chillers were shipped in 1982, down 5.6% from 12,090 in 1981; 3,603 centrifugal chillers were shipped in 1982, including 634 open-type units; and 199 absorption chillers were shipped in 1982, down 16.7% from the 1981 total of 239 units.

The outlook is for a drop in chiller shipments in 1984 of about 8% to 10,000 total units. Although replacements are increasing steadily, the office market at home is likely to remain depressed and spotty recoveries in world markets are likely to be more than compensated for by production abroad that formerly was done in the U.S.

A breakdown by chiller type follows:

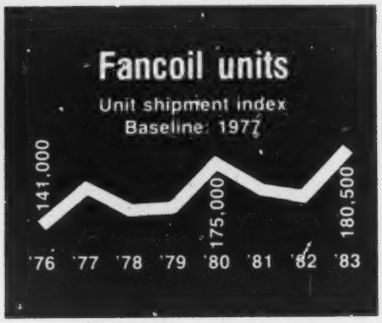
Year	Recip.	Cent.	Abs
1970	10,300	4,150	1,000
1971	10,000	4,000	900
1972	10,000	3,000	900
1973	10,400	4,100	800
1974	11,000	4,500	1,000
1975	8,250	4,950	700
1976	7,600	3,400	500
1977	8,900	3,000	450
1978	8,100	3,350	370
1979	8,100	3,350	280
1980	9,650	4,600	280
1981	9,250	4,300	240
1982	8,500	3,600	200
1983	7,700	3,400	150

Evaporative condensers

Shipments of evaporative condensers for 1982, the latest year for which figures are available, amounted to 2,693 units, a decline of 5.8% from the 2,859 units shipped in 1981, according to the Census Bureau.

Fancoil units

Domestic shipments of fancoil units in 1983 amounted to 180,500 units, up 16.5% from the 155,000 fancoil units shipped in the previous year.



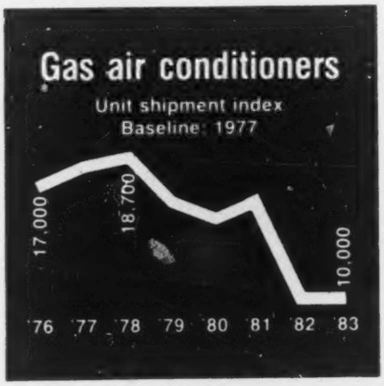
Bureau of the Census figures, which include exports as well as those units destined for U.S. markets, show that 210,410 units were shipped in 1982, the latest year for which figures are available, down 17.1% from the 253,832 units shipped in 1981. Vertical units accounted for about 53% of total shipments in 1982. This compares to about a two-thirds share in the previous two years.

Gas air conditioners

Shipments of gas air conditioners, which became popular in many areas in the 1960's until gas curtailments restricted the market, continue to do reasonably well in Sunbelt areas where cooling hours are long and natural gas is relatively inexpensive.

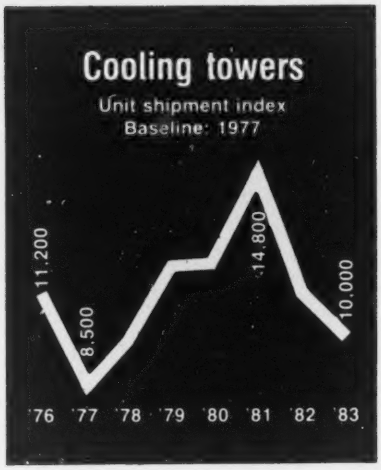
Shipments of gas air conditioners have held steady at 10,000 units for the past two years.

Arkla Industries, Inc., the sole domestic producer of gas-fired equipment, also is developing a gas-fired absorption heat pump. Double-effect absorption cycles and heat pumps now under development by Arkla and others are expected to reach the market within three to five years. Arkla has discontinued production of water-cooled and solar absorption units.



Cooling towers

The only figures available for cooling towers are those collected by the Bureau of the Census. In 1982, the latest year for which figures are available, the bureau reported shipments of 11,222 units, down 27% from the revised 15,581-unit total reported in 1981.



The decline of the office building market and a continuing trend toward air-cooled condensing where economical leads us to believe shipments last year were close to 10,000 units.

Induction units

This is the last year The News will report this category because room induction units now are manufactured by only one company and even the Bureau of the Census has not reported on them for several years because of its disclosure rules. In 1980, the bureau reported 33,343 room induction units were shipped.

The base year for the indexed charts in this year's Statistical Panorama has been changed from 1967 to 1977.

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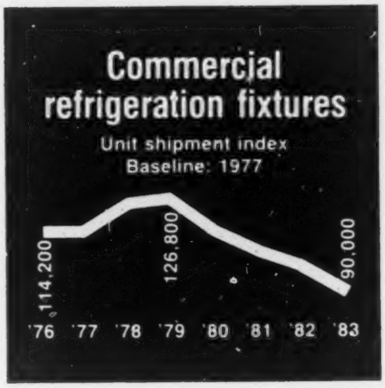
Refrigeration



Unit shipments of commercial refrigeration equipment dropped by 9.3% during the last six months of 1983 when compared with performance during the last six months of the previous year, according to the Commercial Refrigerator Manufacturers Association (CRMA).

No reliable information on shipments for the first six months of both 1982 and 1983 is available because of a decision by CRMA to overhaul its statistical program. In any event, the trade association does not report numerical totals for either total shipments or the various equipment categories.

Based on the percentages provided by CRMA, plus prior-year data published by the Air-Conditioning and Refrigeration Institute (ARI) and the Bureau of the Census, The News estimates that commercial refrigeration shipments declined from 100,000 units in 1982 to 90,000 units last year, or 10%.

CRMA reported that shipments of standard-temperature cases increased by 3.3% for the last six months of 1983 over shipments during the last six months of 1982. Shipments of reach-in cases increased by 6.2% last year over the same six-month period in 1982, and shipments of "other" standard-temperature cases declined by 6.8%.

Under the new format, no dollar values are given. The walk-in category also was eliminated.

Shipments of low-temperature cases declined by 12.4% during the last six months of 1983 when compared with shipments during the last half of 1982. For the same periods, shipments of single-deck cases dropped 17.3%, multidecks decreased by 14.9%, and enclosed-case shipments dropped by 4.3%.

CRMA reported that, after the end of 1984, it would again be able to report full-year shipment percentages.

The last-available Bureau of Census report is based on 1977 data, which is hardly applicable to today's experience. Another of the five-year surveys was conducted in 1982 but, in March of 1984, it had not been published.

In a survey of 100 supermarket chains conducted by Chain Store Age Supermarkets, the chains reported they planned 900 new supermarkets in 1983, up 50% from a depressed 600 new stores in the previous year. The 1,300 remodels planned last year was down sharply from the 3,000 average for the previous five years. The net increase in 1983 was expected to be about 8%.

Of those stores being built, however, an overwhelming percentage will be much larger than past averages. For example, only 9% were planned as conventional supermarkets, 6% were to be warehouse stores, 33% were to be combination stores, and 52% were to be super stores (30,000 sq ft or more and at least $5 million annually in sales). The combination stores are super stores that devote at least 25% of retail floor area to general merchandise.

In fact, Chain Store Age Supermarkets reported that the 10,000 super stores now in operation in the U.S. are grossing more than $100 billion in annual sales and nearly 60% of total supermarket volume. Less than a decade ago, the nation's 40,000 supermarkets generated only half of the sales of today's super stores.

A shopper survey conducted by the magazine revealed that:

- More than half of supermarket shoppers (52.7%) visit the frozen food aisle and most (48.3% of the total) buy at least one item.
- About 40% of shoppers prefer glass-door cases with upright shelves; 20.3% prefer open multidecks; 23.7% prefer open coffin-type cases; and 6.7% prefer plastic-covered coffin cases.
- One out of every four frozen food purchases are on impulse. Less than one in 50 shoppers considers frozen food when deciding where to shop; 35.5% think of the meat; 18.6% think of dairy products; and 10.3% think of produce.
- Fresh foods are the chief enemies of frozen foods — 14.3% find frozen foods more expensive; 11.9% said fresh foods taste better; and 3.3% said frozen foods are not frozen properly.
- Of those who prefer frozen foods, 48.2% cited convenience and ease of preparation; 15.3% said frozen foods taste better; 9.9% like the longer storage life; 3.6% like the better product mix; and only 5% are influenced by coupons.
- An equal number (37%) said they were buying more frozen foods than a year ago as said they were buying less.

Refrigerators

Domestic refrigerator shipments totaled 5,316,100 units last year, up 21.8% from the 4,363,500 units shipped in 1982, according to the Association of Home Appliance Manufacturers (AHAM).

The appliance industry is forecasting an overall increase in appliance shipments for 1984, which would make it the second best year in the industry's history. Increased consumer confidence and a strong housing market are cited as the chief architects of optimism.

Shipments of home freezers in 1983 amounted to 1,287,500 units, down 3.9% from the 1,340,400 units shipped in the previous year. The 1983 breakdown shows that 607,400, or 47%, were upright freezers and 680,100, or 53%, were chest-type freezers.

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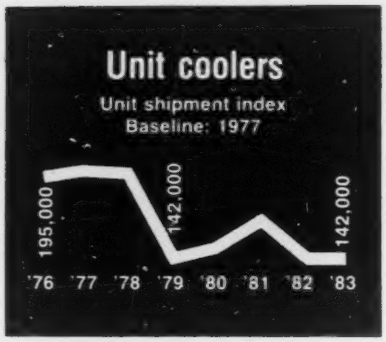

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Unit coolers

Shipments of unit coolers held steady in 1983 at 142,000 units, almost the same as the 141,600 unit coolers shipped in 1982.

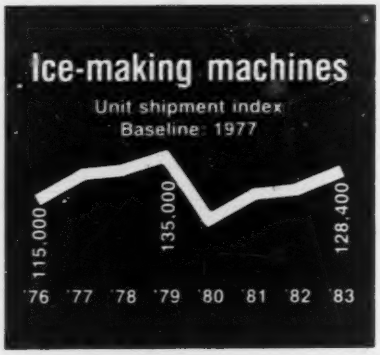
It might be noted that the Bureau of the Census reported that 163,697 unit coolers were shipped in 1982, the latest year for which figures were available, down 3.4% from the 169,487 units shipped in the previous year.

Ice-makers

Shipments of ice-making equipment increased by 5.6% in 1983 to a total of 128,400 units. The total for 1982 was 121,500 units. The News believes that 70% were cubers, 19% were flakers, and 11% were miscellaneous and combination units.

The Bureau of the Census reports 148,609 ice-makers were shipped in 1982, the latest year for which figures are available, down 10.3% from the revised total of 165,626 units shipped in the previous year.

Investigation reveals no obvious reason for the marked discrepancy between industry and Census Bureau figures. Both include exported units and both claim to represent virtually all U.S. manufacturers. A consolidation in the industry could clear up the matter next year.



Refrigerated warehouses

The International Association of Refrigerated Warehouses (IARW) reports that the nearly 1 billion cu ft of public freezer space in place in 1983 represents about 65% of the nation's total freezer capacity for goods held more than 30 days. Total space is expected to top the 1 billion cu ft mark this year.

The trend toward fewer but larger warehouses continues. Too, rising energy costs have influenced owners to take many older warehouses out of service.

IARW reported that in November, 1983, the peak of the fall season, 6,696,710,000 lb of food were being held in public refrigerated coolers and that 7,447,655,000 lb of food were being held in public freezers. The total was 14.1 billion lb. Public cooler capacity during the 1983 fall season averaged 64%, up 1% from the previous year's experience.

Heating

Residential boilers

Gas-, oil-, and solid fuel-fired boiler unit shipments dropped by 11.4% in 1983 to 230,165 units from a revised total of 259,896 units in 1982, according to The Hydronics Institute (HI).

Shipments of **cast-iron boilers** decreased by 14.2% last year to 199,953 units from a revised 1982 total of 232,975 units. Shipments of **steel boilers,** on the other hand, increased by 12.2% from 26,921 units in 1982 to 30,212 units last year.

The surge of gas-fired boiler shipments of four years ago, brought about by high oil prices and the availability of natural gas after years of curtailment, has completely subsided. Oil prices peaked two years ago and have dropped back while natural gas prices have continued to escalate.

The gas share of the cast-iron boiler market, which had soared to 85% in 1980, settled back to a more normal 71% in 1981 and to 64% last year. It had dropped to 50% in 1977, the last year of widespread gas curtailments. It might also be noted that only 3.7% of steel boilers shipped last year were fired by natural gas.

Oil's share of the cast-iron boiler

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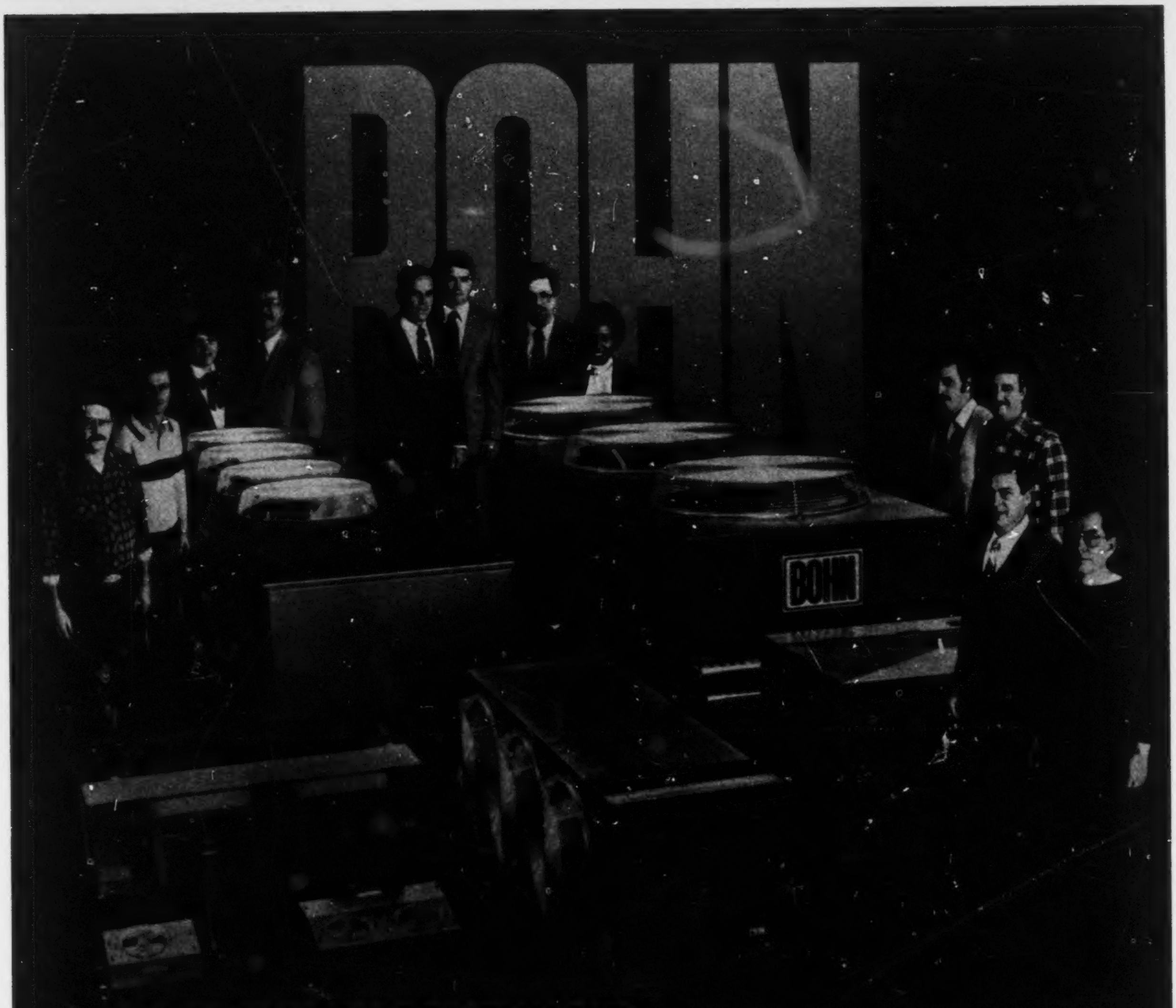
Estimated 1983 cast iron boiler shipments by thermal capacity

Gross output, Btu/h	Steam	Water	Total
Less than 50,000	534	6,782	7,316
50,000 to 74,999	1,034	20,784	21,818
75,000 to 99,999	5,892	31,824	37,716
100,000 to 124,999	11,315	38,411	49,726
125,000 to 149,999	7,404	24,463	31,867
150,000 to 199,999	6,020	15,129	21,149
200,000 to 249,999	3,818	8,556	12,374
250,000 to 449,999	3,906	6,158	10,064
450,000 to 949,999	2,168	1.718	3,886
950,000 to 1,549,999	1,171	775	1,946
1,550,000 and over	1,298	793	2,091
Total	**44,560**	**155,393**	**199,953**



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FROM PAGE 34

market in 1983 was 35.9%, up slightly from the 31.6% share it had in the previous year and more than double the 15% share it had in 1980. The oil share in 1977 was 49.5%. Oil's share of the steel boiler market in 1983 was an overwhelming 88.8%.

Boilers fired by solid fuels (coal, wood, waste) amounted to 0.04%, down sharply from the 0.2% of total cast-iron boiler shipments in 1982 and the 0.3% share in 1981.

The share of cast-iron hot water boilers, at 77.7%, continued to hold relatively constant, as did cast-iron steam boilers at 22.3%. The shares in 1982 were 75.1% hot water and 24.9% steam.

Radiation shipments in 1983, according to HI, were: **convectors** 1,962,318 sq ft EDR (equivalent direct radiation), up 0.8% from the 1982 figure of 1,946,658 sq ft EDR; **baseboard** 33,584,977 sq ft EDR, up 9.5% from the 1982 figure of 30,390,013 sq ft EDR; and **commercial finned tube** 6,533,158 sq ft EDR, down 13% from the 1982 total of 7,517,232 sq ft EDR.

Total radiation, at 42,080,453 sq ft EDR last year, was up 5.6% from the 1982 total of 39,853,903 sq ft EDR.

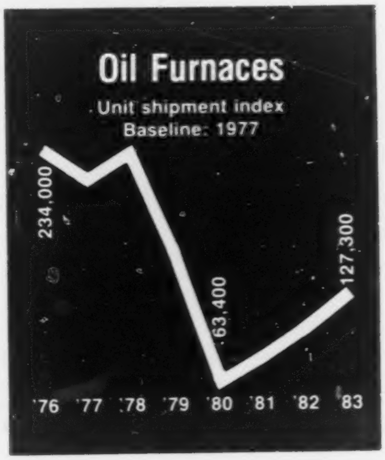
Total **hydronic baseboard** shipped in 1983 was 10,123,364 lineal feet, an increase of 10.5% over the 9,159,431 lineal feet shipped in the previous year.

Even with the increase, shipments of radiation products are far below those of only a few years ago. Total shipments in 1979, for example, amounted to 57.8 million sq ft EDR. The drop is partially because of the fewer number of conversions, primarily from electric resistance baseboard. But the main reason is the strong replacement market — about 85% of the total — where radiation already is in place.

The recovery of the new home market has not helped the growth of hydronic systems, primarily because of their shrinking share of market. But the well-demonstrated trend among today's homeowners to replace working equipment for the sake of efficiency as well as to replace worn out units should overcome any new-home losses this year. Look for about an 8% increase in 1984.

Estimated 1983 cast-iron boiler shipments by fuel

Gross output, Btu/h	Solid fuel	Gas-fired	Oil-fired	Total
Less than 50,000	—	6,477	839	7,316
50,000 to 74,999	—	21,715	103	21,818
75,000 to 99,999	3	32,808	4,905	37,716
100,000 to 124,999	13	29,068	20,591	49,672
125,000 to 149,999	27	13,432	18,417	31,876
150,000 to 199,999	23	8,789	12,368	21,180
200,000 to 249,999	10	7,602	4,763	12,375
250,000 to 449,999	1	5,141	4,935	10,077
450,000 to 949,999	7	1,754	2,125	3,886
950,000 to 1,549,999	2	841	1,103	1,946
1,550,000 and over	2	401	1,688	2,091
Total	**88**	**128,028**	**71,837**	**199,953**



Residential furnaces

The recovery of new home construction in the Northeast and the Midwest has helped **oil furnace** shipments to come at least half-way back from the fuel oil price-induced slide of 1979 and 1980. Oil furnace shipments in 1983 totaled 127,300 units, 23% from the 103,500 units shipped in the previous year, according to the Gas Appliance Manufacturers Association (GAMA).

In November, 1983, GAMA's member manufacturers forecast that oil furnace shipments would increase this year to 122,400 units, or a 7.8% increase over the 1983 performance. We agree. In fact, the consensus forecast may be a bit conservative. For perspective, it might be remembered that oil furnace shipments in 1978, before the effect of the second major oil price escalation was felt, amounted to 228,300 units.

GAMA has advised The News that its figures have not been expanded to include the total industry. The Bureau of the Census reported shipments of 109,036 oil-fired furnaces in 1982, the latest year for which figures are available. In 1981, the Census Bureau figure was 90,518 units.

Gas furnace shipments, because of the tremendous increase in new home starts, and to a lesser extent the growing trend toward the replacement of existing furnaces with higher-efficiency models, totaled 1,661,765 units in 1983, a 43.8% increase over the 1,155,600 units shipped in the previous year.

To demonstrate how the recession

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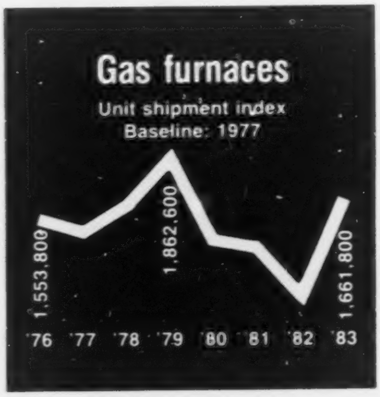

188 cities show variety of heating-cooling, fuel systems

Here are 188 markets, representing a cross section of the United States, defined in terms of their home heating fuels and types of heating-cooling systems. Data were taken from the 1980 Census of Population and Housing. (Reports contained in earlier issues of Statistical Panorama were preliminary; statistics found in the following pages are final.)

For about one-half of the cities listed, data are given on the age of home heating systems. This was derived from the 1981 and 1982 Annual Housing Survey.

Included are not only the largest Standard Metropolitan Statistical Areas (SMSA's) but also many medium and smaller sized cities. Ten-year growth patterns will show the additions to their housing stock, as well as the decade-long growth of centrally cooled homes and homes heated with forced air and hydronic systems. Where the 10-year growth is less than 1%, we have indicated it by a blank.

For the first time, heat pumps were reflected in the decennial census, and in some major markets, they now have a higher than 10% saturation.

Also shown is the 10-year growth of central air conditioning in America's homes — overcoming two oil shocks and spiraling energy costs. Today, cities in the Sunbelt have central cooling saturation at the 60% and 70% levels.

A vibrant replacement market coupled with a still booming housing market should keep the residential sector of the hvac market very busy for the immediate future.

Alphabetical listing of cities

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Stamford, Conn.	47
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Stockton, Calif.	43
Syracuse, N.Y.	80
Tacoma, Wash.	95
Tallahassee, Fla.	48
Tampa, Fla.	52
Terre Haute, Ind.	59
Toledo, Ohio	85
Topeka, Kan.	60
Trenton, N.J.	76
Tucson, Ariz.	41
Tulsa, Okla.	86
Utica, N.Y.	80
Vallejo, Calif.	43
Waco, Texas	93
Washington, D.C.	47
Waterbury, Conn.	47
West Palm Beach, Fla.	52
Wheeling, W. Va.	96
Wichita, Kan.	60
Wilmington, Del.	47
Wilmington, N.C.	83
Worcester, Mass.	65
York, Pa.	89
Youngstown, Ohio	85

Birmingham, Ala.

Housing units	324,998
Central cooling	44%
Room units	32%

Home heating system

Warm air furnace	52%
Hydronic	3%
Heat pump	5%
Other/none	40%

Home heating fuel

Gas	70%
Fuel oil	—
Electricity	16%
Bottled/tank/LP	8%
Other/none	6%

Age of heating system

168,957 single family detached

0-3 years	18%
4-10 years	24%
11-20 years	27%
21-40 years	8%
41+ years	33%

Anchorage, Alaska

Housing units	69,895
Central cooling	—
Room units	--

Home heating system

Warm air furnace	23%
Hydronic	54%
Heat pump	3%
Other/none	20%

Home heating fuel

Gas	71%
Fuel oil	7%
Electricity	18%
Bottled/tank/LP	1%
Other/none	4%

1970 - 1980 growth

Single family homes	22,775
Multifamily homes	19,162
Centrally cooled homes	—
Warm air furnaces	12,232
Hydronic systems	27,177

Phoenix, Ariz.

Housing units	599,726
Central cooling	79%
Room units	6%

Home heating system

Warm air furnace	60%
Hydronic	1%
Heat pump	22%
Other/none	17%

Home heating fuel

Gas	52%
Fuel oil	—
Electricity	45%
Bottled/tank/LP	2%
Other/none	1%

Age of heating system

366,528 single family detached

0-3 years	16%
4-10 years	29%
11-20 years	21%
21-40 years	8%
41+ years	26%

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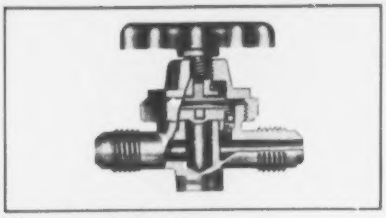


Forged Brass Packless Valves Have Greater Flow, Less Weight

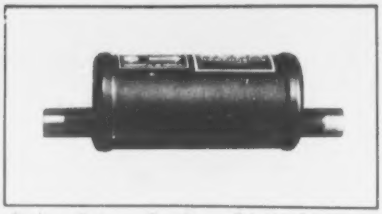
Henry Valve Company, Melrose Park, Illinois has available an extensive line of Golden Bantam type forged brass, diaphragm packless valves that provide greater flow with less pressure drop due to a unique and improved cored valve body forging.

Golden Bantam globe and angle valves are small, compact, light in weight, simple in design and low in cost. Valves feature positive backseating, forged brass bonnet and hermetic seal between diaphragm and body. Brass stem cap minimizes wear and stainless steel spring insures long life. Golden Bantam valves are UL and CSA listed and are individually packaged and labeled. Round hand wheel for easy grip.

All standard sizes are available from ¼″ up to 1⅝″. Available with flare or ODS connections and with extended copper ends.

Circle No. 75

AC&R Components, Inc. Mufflers Provide Quiet Operation, Minimum Pressure Drop

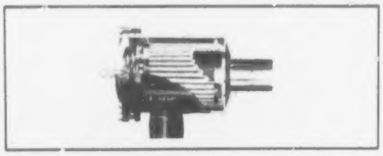


AC&R Components, Inc., Chatham, Illinois has a full line of discharge line mufflers designed to make the refrigeration compressor operate quieter with a minimum amount of pressure drop.

These mufflers are designed to eliminate the pulsation common in compressor discharge lines running to remote condensers. Internal baffles change the velocity of the discharge gasses passing through the muffler in a way that minimizes reduction of pressure. The end result is a dampening effect on high frequency sound waves accompanying the gasses discharged on high speed compressors. The muffler also flattens out the pulsating waves of low speed compressors.

AC&R Components, Inc. mufflers are sized to the compressor discharge lines and available in thirteen standard connections ranging from ½″ ODS through 3⅛″ ODS. S-6300 Series has a working pressure of 500 PSIG. S-6400 and S-6600 Series have a working pressure of 450 PSIG.

Circle No. 76



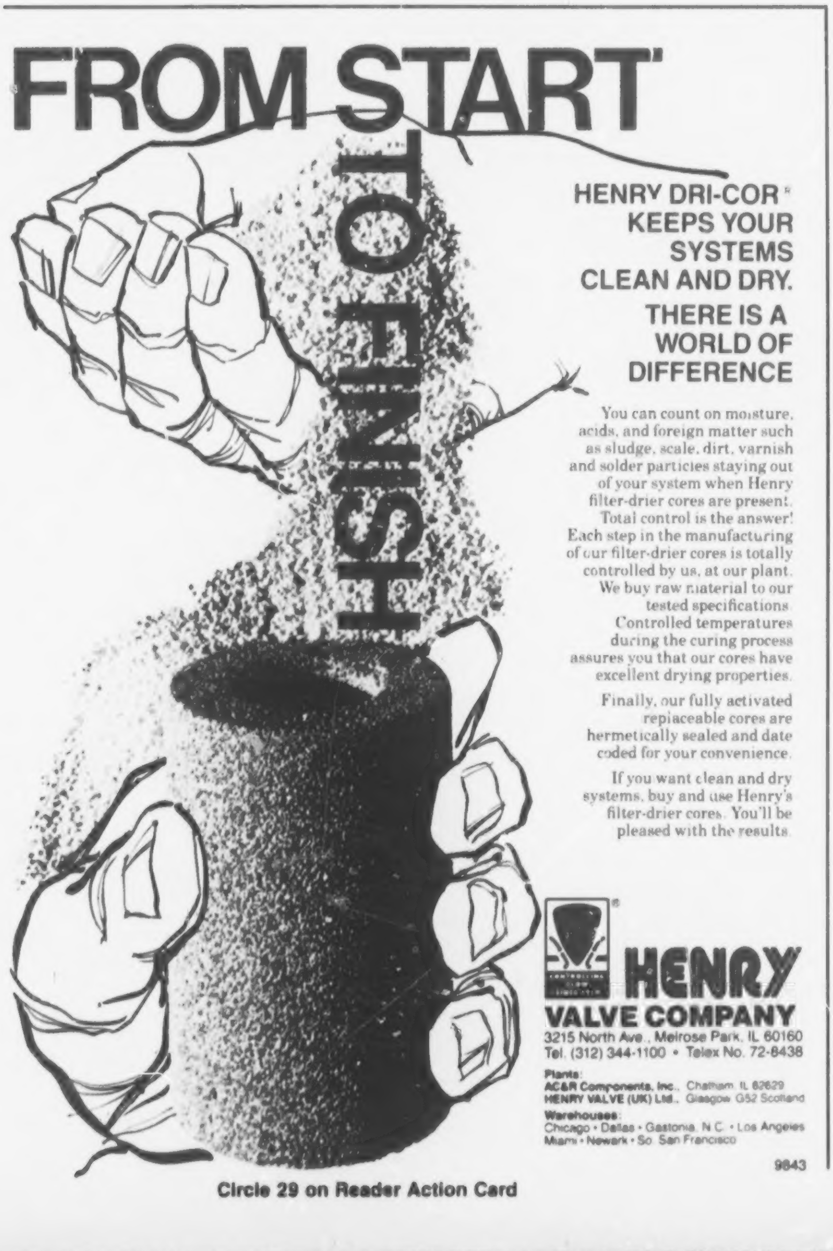
Suction Line Accumulator From AC&R Components, Inc. Prevents Compressor Damage

A complete line of vertical suction line accumulators designed to protect compressors from sudden surges of refrigerant and oil coming down the suction side, is available from AC&R Components, Inc., Chatham, Illinois.

The AC&R Components, Inc. suction line accumulator acts as a temporary reservoir for holding unwanted liquid refrigerant and oil. The accumulator is designed to meter the mixture back into the compressor at an acceptable rate preventing damage to compressor reed valves, pistons, rods and crank shafts.

These accumulators are perfect for use on heat pump installations, low temperature display cases, truck units and liquid chillers. All steel construction with a special rust resistant finish. Extruded holes in inlet cap provide high strength and copper hydrogen brazed construction assures cleanliness. UL and CSA listed. Fusible plug relief device is standard. Write AC&R Components, Inc. for details.

Circle No. 77



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9843

Circle 29 on Reader Action Card

Tucson, Ariz.

Housing units	216,000
Central cooling	52%
Room units	9%

Home heating system

Warm air furnace	71%
Hydronic	—
Heat pump	6%
Other/none	23%

Home heating fuel

Gas	75%
Fuel oil	—
Electricity	19%
Bottled/tank/LP	3%
Other/none	3%

Age of heating system
121,081 single family detached

0-3 years	17%
4-10 years	26%
11-20 years	24%
21-40 years	13%
41+ years	20%

Fort Smith, Ark.

Housing units	80,813
Central cooling	36%
Room units	37%

Home heating system

Warm air furnace	41%
Hydronic	—
Heat pump	2%
Other/none	57%

Home heating fuel

Gas	63%
Fuel oil	—
Electricity	16%
Bottled/tank/LP	8%
Other/none	13%

1970 - 1980 growth

Single family homes	31,409
Multifamily homes	11,562
Centrally cooled homes	23,812
Warm air furnaces	23,812
Hydronic systems	—

Little Rock, Ark.

Housing units	151,474
Central cooling	58%
Room units	27%

Home heating system

Warm air furnace	65%
Hydronic	—
Heat pump	2%
Other/none	33%

Home heating fuel

Gas	79%
Fuel oil	4%
Electricity	15%
Bottled/tank/LP	—
Other/none	2%

Age of heating system
108,569 single family detached

0-3 years	11%
4-10 years	28%
11-20 years	30%
21-40 years	11%
41+ years	20%

Anaheim, Calif.

Housing units	720,107
Central cooling	22%
Room units	19%

Home heating system

Warm air furnace	65%
Hydronic	1%
Heat pump	1%
Other/none	33%

Home heating fuel

Gas	83%
Fuel oil	—
Electricity	16%
Bottled/tank/LP	—
Other/none	1%

Age of heating system
386,220 single family detached

0-3 years	12%
4-10 years	21%
11-20 years	30%
21-40 years	19%
41+ years	18%

Bakersfield, Calif.

Housing units	154,352
Central cooling	51%
Room units	15%

Home heating system

Warm air furnace	50%
Hydronic	1%
Heat pump	1%
Other/none	48%

Home heating fuel

Gas	77%
Fuel oil	—
Electricity	12%
Bottled/tank/LP	7%
Other/none	4%

Age of heating system
103,499 single family detached

0-3 years	12%
4-10 years	16%
11-20 years	23%
21-40 years	15%
41+ years	34%

Fresno, Calif.

Housing units	191,826
Central cooling	60%
Room units	16%

Home heating system

Warm air furnace	59%
Hydronic	1%
Heat pump	1%
Other/none	31%

Home heating fuel

Gas	70%
Fuel oil	—
Electricity	18%
Bottled/tank/LP	8%
Other/none	4%

Age of heating system
126,755 single family detached

0-3 years	13%
4-10 years	40%
11-20 years	18%
21-40 years	5%
41+ years	24%

Los Angeles, Calif.

Housing units	2,853,653
Central cooling	18%
Room units	23%

Home heating system

Warm air furnace	35%
Hydronic	4%
Heat pump	1%
Other/none	60%

Home heating fuel

Gas	84%
Fuel oil	—
Electricity	13%
Bottled/tank/LP	1%
Other/none	2%

Age of heating system

1,481,322 single family detached

0-3 years	9%
4-10 years	10%
11-20 years	19%
21-40 years	28%
41+ years	34%

Modesto, Calif.

Housing units	102,287
Central cooling	51%
Room units	29%

Home heating system

Warm air furnace	53%
Hydronic	—
Heat pump	2%
Other/none	45%

Home heating fuel

Gas	79%
Fuel oil	—
Electricity	15%
Bottled/tank/LP	3%
Other/none	3%

1970 - 1980 growth

Single family homes	23,236
Multifamily homes	13,885
Centrally cooled homes	38,774
Warm air furnaces	34,097
Hydronic systems	—

Oxnard, Calif.

Housing units	182,730
Central cooling	18%
Room units	7%

Home heating system

Warm air furnace	63%
Hydronic	—
Heat pump	1%
Other/none	36%

Home heating fuel

Gas	88%
Fuel oil	—
Electricity	9%
Bottled/tank/LP	2%
Other/none	1%

Age of heating system

118,323 single family detached

0-3 years	17%
4-10 years	15%
11-20 years	32%
21-40 years	16%
41+ years	20%

Sacramento, Calif.

Housing units	415,594
Central cooling	54%
Room units	29%

Home heating system

Warm air furnace	56%
Hydronic	1%
Heat pump	5%
Other/none	38%

Home heating fuel

Gas	73%
Fuel oil	—
Electricity	22%
Bottled/tank/LP	2%
Other/none	3%

Age of heating system

258,959 single family detached

0-3 years	27%
4-10 years	16%
11-20 years	23%
21-40 years	10%
41+ years	24%

Salinas, Calif.

Housing units	103,369
Central cooling	2%
Room units	1%

Home heating system

Warm air furnace	49%
Hydronic	2%
Heat pump	1%
Other/none	48%

Home heating fuel

Gas	76%
Fuel oil	—
Electricity	17%
Bottled/tank/LP	4%
Other/none	3%

Age of heating system

61,290 single family detached

0-3 years	16%
4-10 years	17%
11-20 years	10%
21-40 years	13%
41+ years	44%

San Diego, Calif.

Housing units	718,211
Central cooling	13%
Room units	12%

Home heating system

Warm air furnace	46%
Hydronic	1%
Heat pump	2%
Other/none	51%

Home heating fuel

Gas	72%
Fuel oil	—
Electricity	23%
Bottled/tank/LP	2%
Other/none	3%

Age of heating system

387,822 single family detached

0-3 years	14%
4-10 years	23%
11-20 years	20%
21-40 years	17%
41+ years	26%

San Francisco, Calif.

Housing units	1,337,841
Central cooling	9%
Room units	6%

Home heating system

Warm air furnace	51%
Hydronic	9%
Heat pump	1%
Other/none	39%

Home heating fuel

Gas	84%
Fuel oil	—
Electricity	14%
Bottled/tank/LP	1%
Other/none	1%

Age of heating system
655,820 single family detached

0-3 years	11%
4-10 years	19%
11-20 years	21%
21-40 years	22%
41+ years	27%

San Jose, Calif.

Housing units	473,550
Central cooling	10%
Room units	11%

Home heating system

Warm air furnace	60%
Hydronic	2%
Heat pump	1%
Other/none	37%

Home heating fuel

Gas	81%
Fuel oil	—
Electricity	17%
Bottled/tank/LP	1%
Other/none	1%

Age of heating system
282,820 single family detached

0-3 years	13%
4-10 years	22%
11-20 years	27%
21-40 years	12%
41+ years	26%

Santa Barbara, Calif.

Housing units	114,732
Central cooling	2%
Room units	2%

Home heating system

Warm air furnace	49%
Hydronic	—
Heat pump	1%
Other/none	50%

Home heating fuel

Gas	80%
Fuel oil	—
Electricity	16%
Bottled/tank/LP	2%
Other/none	2%

Age of heating system
68,281 single family detached

0-3 years	8%
4-10 years	8%
11-20 years	29%
21-40 years	11%
41+ years	44%

Santa Rosa, Calif.

Housing units	123,749
Central cooling	11%
Room units	9%

Home heating system

Warm air furnace	49%
Hydronic	—
Heat pump	1%
Other/none	50%

Home heating fuel

Gas	75%
Fuel oil	13%
Electricity	—
Bottled/tank/LP	4%
Other/none	8%

1970 - 1980 growth

Single family homes	28,200
Multifamily homes	18,275
Centrally cooled homes	10,244
Warm air furnaces	35,293
Hydronic systems	1,098

Stockton, Calif.

Housing units	135,580
Central cooling	47%
Room units	34%

Home heating system

Warm air furnace	51%
Hydronic	2%
Heat pump	1%
Other/none	46%

Home heating fuel

Gas	79%
Fuel oil	—
Electricity	15%
Bottled/tank/LP	4%
Other/none	2%

Age of heating system
89,290 single family detached

0-3 years	20%
4-10 years	22%
11-20 years	19%
21-40 years	15%
41+ years	24%

Vallejo, Calif.

Housing units	122,491
Central cooling	29%
Room units	15%

Home heating system

Warm air furnace	57%
Hydronic	—
Heat pump	1%
Other/none	42%

Home heating fuel

Gas	82%
Fuel oil	—
Electricity	12%
Bottled/tank/LP	2%
Other/none	4%

1970 - 1980 growth

Single family homes	30,125
Multifamily homes	12,131
Centrally cooled homes	35,190
Warm air furnaces	38,331
Hydronic systems	—

Colorado - Connecticut

Colorado Springs, Colo

Housing units	121,308
Central cooling	8%
Room units	11%

Home heating system

Warm air furnace	72%
Hydronic	12%
Heat pump	1%
Other/none	15%

Home heating fuel

Gas	85%
Fuel oil	—
Electricity	10%
Bottled/tank/LP	4%
Other/none	1%

1970 - 1980 growth

Single family homes	31,214
Multifamily homes	17,204
Centrally cooled homes	10,218
Warm air furnaces	34,800
Hydronic systems	6,107

Denver, Colo.

Housing units	651,141
Central cooling	17%
Room units	16%

Home heating system

Warm air furnace	20%
Hydronic	70%
Heat pump	1%
Other/none	9%

Home heating fuel

Gas	88%
Fuel oil	—
Electricity	9%
Bottled/tank/LP	—
Other/none	3%

Age of heating system

390,288 single family detached

0-3 years	18%
4-10 years	24%
11-20 years	22%
21-40 years	16%
41+ years	20%

Bridgeport, Conn.

Housing units	142,323
Central cooling	11%
Room units	41%

Home heating system

Warm air furnace	36%
Hydronic	48%
Heat pump	1%
Other/none	15%

Home heating fuel

Gas	32%
Fuel oil	60%
Electricity	5%
Bottled/tank/LP	—
Other/none	3%

Age of heating system

82,211 single family detached

0-3 years	12%
4-10 years	27%
11-20 years	18%
21-40 years	27%
41+ years	16%

Hartford, Conn.

Housing units	268,029
Central cooling	9%
Room units	42%

Home heating system

Warm air furnace	22%
Hydronic	59%
Heat pump	1%
Other/none	18%

Home heating fuel

Gas	25%
Fuel oil	62%
Electricity	9%
Bottled/tank/LP	1%
Other/none	3%

Age of heating system

156,578 single family detached

0-3 years	9%
4-10 years	14%
11-20 years	26%
21-40 years	38%
41+ years	13%

New Britain, Conn.

Housing units	53,655
Central cooling	6%
Room units	45%

Home heating system

Warm air furnace	26%
Hydronic	49%
Heat pump	1%
Other/none	24%

Home heating fuel

Gas	39%
Fuel oil	49%
Electricity	8%
Bottled/tank/LP	—
Other/none	4%

1970 - 1980 growth

Single family homes	5,014
Multifamily homes	1,498
Centrally cooled homes	1,977
Warm air furnaces	2,266
Hydronic systems	2,887

New Haven, Conn.

Housing units	156,828
Central cooling	9%
Room units	35%

Home heating system

Warm air furnace	35%
Hydronic	46%
Heat pump	2%
Other/none	17%

Home heating fuel

Gas	19%
Fuel oil	66%
Electricity	11%
Bottled/tank/LP	—
Other/none	4%

Age of heating system

83,208 single family detached

0-3 years	10%
4-10 years	33%
11-20 years	30%
21-40 years	18%
41+ years	9%

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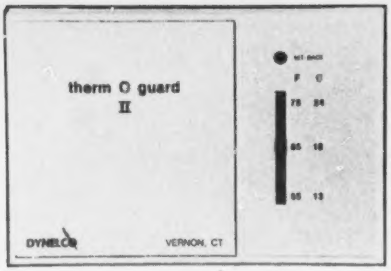

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Circle 64 on Reader Action Card

New London, Conn.

Housing units	91,196
Central cooling	2%
Room units	27%

Home heating system	
Warm air furnace	19%
Hydronic	54%
Heat pump	1%
Other/none	26%

Home heating fuel	
Gas	12%
Fuel oil	68%
Electricity	13%
Bottled/tank/LP	2%
Other/none	5%

1970 - 1980 growth	
Single family homes	19,184
Multifamily homes	7,057
Centrally cooled homes	1,647
Warm air furnaces	4,831
Hydronic systems	10,058

Stamford, Conn.

Housing units	74,793
Central cooling	12%
Room units	49%

Home heating system	
Warm air furnace	20%
Hydronic	65%
Heat pump	3%
Other/none	12%

Home heating fuel	
Gas	24%
Fuel oil	59%
Electricity	11%
Bottled/tank/LP	—
Other/none	6%

1970 - 1980 growth	
Single family homes	4,507
Multifamily homes	4,364
Centrally cooled homes	6,801
Warm air furnaces	2,765
Hydronic systems	595

Waterbury, Conn.

Housing units	84,524
Central cooling	8%
Room units	37%

Home heating system	
Warm air furnace	23%
Hydronic	50%
Heat pump	2%
Other/none	25%

Home heating fuel	
Gas	21%
Fuel oil	62%
Electricity	13%
Bottled/tank/LP	—
Other/none	4%

1970 - 1980 growth	
Single family homes	12,414
Multifamily homes	8,996
Centrally cooled homes	5,693
Warm air furnaces	3,884
Hydronic systems	6,567

Wilmington, Del.

Housing units	194,035
Central cooling	31%
Room units	36%

Home heating system	
Warm air furnace	57%
Hydronic	25%
Heat pump	2%
Other/none	16%

Home heating fuel	
Gas	32%
Fuel oil	55%
Electricity	9%
Bottled/tank/LP	1%
Other/none	3%

Age of heating system
108,658 single family detached

0-3 years	17%
4-10 years	29%
11-20 years	23%
21-40 years	16%
41+ years	15%

District of Columbia

Housing units	1,179,845
Central cooling	62%
Room units	22%

Home heating system	
Warm air furnace	59%
Hydronic	24%
Heat pump	6%
Other/none	11%

Home heating fuel	
Gas	55%
Fuel oil	25%
Electricity	17%
Bottled/tank/LP	1%
Other/none	2%

Age of heating system
503,241 single family detached

0-3 years	16%
4-10 years	20%
11-20 years	23%
21-40 years	17%
41+ years	24%

Fort Lauderdale, Fla.

Housing units	477,468
Central cooling	68%
Room units	25%

Home heating system	
Warm air furnace	38%
Hydronic	2%
Heat pump	21%
Other/none	39%

Home heating fuel	
Gas	8%
Fuel oil	—
Electricity	81%
Bottled/tank/LP	5%
Other/none	6%

Age of heating system
202,898 single family detached

0-3 years	13%
4-10 years	32%
11-20 years	16%
21-40 years	10%
41+ years	35%

Florida

Gainesville, Fla.

Housing units	58,896
Central cooling	57%
Room units	22%

Home heating system

Warm air furnace	55%
Hydronic	—
Heat pump	9%
Other/none	36%

Home heating fuel

Gas	24%
Fuel oil	15%
Electricity	41%
Bottled/tank/LP	17%
Other/none	3%

1970 - 1980 growth

Single family homes	10,943
Multifamily homes	14,438
Centrally cooled homes	24,201
Warm air furnaces	3,760
Hydronic systems	404

Jacksonville, Fla.

Housing units	290,250
Central cooling	49%
Room units	28%

Home heating system

Warm air furnace	45%
Hydronic	1%
Heat pump	11%
Other/none	43%

Home heating fuel

Gas	8%
Fuel oil	35%
Electricity	39%
Bottled/tank/LP	16%
Other/none	2%

Age of heating system
185,015 single family detached

0-3 years	18%
4-10 years	17%
11-20 years	31%
21-40 years	5%
41+ years	29%

Miami, Fla.

Housing units	663,343
Central cooling	45%
Room units	42%

Home heating system

Warm air furnace	29%
Hydronic	5%
Heat pump	14%
Other/none	52%

Home heating fuel

Gas	12%
Fuel oil	2%
Electricity	64%
Bottled/tank/LP	7%
Other/none	15%

Age of heating system
282,381 single family detached

0-3 years	17%
4-10 years	30%
11-20 years	10%
21-40 years	4%
41+ years	39%

Orlando, Fla.

Housing units	273,863
Central cooling	61%
Room units	23%

Home heating system

Warm air furnace	54%
Hydronic	—
Heat pump	10%
Other/none	36%

Home heating fuel

Gas	10%
Fuel oil	19%
Electricity	58%
Bottled/tank/LP	10%
Other/none	3%

Age of heating system
175,421 single family detached

0-3 years	29%
4-10 years	22%
11-20 years	17%
21-40 years	10%
41+ years	22%

Pensacola, Fla.

Housing units	108,216
Central cooling	51%
Room units	30%

Home heating system

Warm air furnace	54%
Hydronic	1%
Heat pump	5%
Other/none	40%

Home heating fuel

Gas	48%
Fuel oil	—
Electricity	36%
Bottled/tank/LP	12%
Other/none	4%

1970 - 1980 growth

Single family homes	18,586
Multifamily homes	12,466
Centrally cooled homes	39,755
Warm air furnaces	33,764
Hydronic systems	—

Tallahassee, Fla.

Housing units	64,133
Central cooling	56%
Room units	25%

Home heating system

Warm air furnace	51%
Hydronic	—
Heat pump	13%
Other/none	36%

Home heating fuel

Gas	14%
Fuel oil	14%
Electricity	46%
Bottled/tank/LP	21%
Other/none	5%

1970 - 1980 growth

Single family homes	14,744
Multifamily homes	16,817
Centrally cooled homes	27,762
Warm air furnaces	20,286
Hydronic systems	—

The only valve you can service in seconds with one wrench.

Our exclusive "I" Series Take-A-Part Thermo® Valve is simplicity itself.

If you ever have to service it, just loosen two screws and lift out the cage. You'll never have to break the connections.

As for versatility, over 1200 combinations of interchangeable power heads, cages and body flanges let you mix and match from stock to fit your job exactly — for anything from heat pumps to commercial units. 1/2 to 100-ton capacities.

Easy order, easy service: Alco "I" Series with large diaphragms for smooth precise control. What could be simpler? See your Alco Wholesaler Pro, or call us at 1-800-322-ALCO.

ALCO...leading the way in flow controls.

One wrench — two bolts — 30 seconds and over 1200 component combinations. That makes Alco's Take-A-Part the simplest, most versatile valve you can stock.

Alco's revolutionary EK-Plus filter-drier, with its efficient bead medium, proves once and for all that wax, acid, water and other contaminants can be completely eliminated.

ALCO CONTROLS

Alco Controls Division, Emerson Electric Co., P.O. Box 12700, St. Louis, MO 63141 Telex 209885

EMERSON

Circle 2 on Reader Action Card

Some of these Dealers

are going to have a *BIG* year in 1984!

They're Comfortmaker dealers with year 'round backing from Climate Control.

Fast, on-time delivery.
Weather won't wait. As one of the nation's largest producers of furnace and air conditioning equipment, Climate Control has the products when you need them, where you need them. Comfortmaker dealers have confidence in Climate Control delivery and national warehouse network.

Energy-saving products.
Dealers know energy-saving products are what sell today. And nobody knows more about energy-saving than Climate Control. The new Deluxe Heat Pump cuts heating bills 30 to 50 percent and provides the most efficient air conditioning money can buy. And Climate Control's new "RPJ" heat exchanger features the tightest seal ever produced in the furnace industry. Saves energy. Lasts longer. For energy-saving innovations in residential and light commercial products, look to Climate Control.

Full load factory testing.
Every Climate Control unit is thoroughly tested at full load operating conditions. No other manufacturer makes this 100 percent full load testing promise. When you install a Comfortmaker brand unit, it operates right the first time. You save on installation and you have a happy customer. These pre-tested products are yours to sell when you're a Comfortmaker dealer.

High quality at the right price.
Comfortmaker brand products have an 84-year reputation for the highest quality. Rugged, electro-coated steel casings, fully tested, reliable components, high energy efficiency, and a 20-year limited warranty on heat exchangers. And what's more, Climate Control gives you competitive prices. After all, the profitability of every Comfortmaker dealer is *very* important to Climate Control.

Total support.
An all-new co-op ad program gets your name out front. Build your business with attention-getting ad slicks, radio commercials, consumer literature, signs, banners, uniforms, truck decals. And training programs, too. All the support you need to increase your profits in 1984. And to top it off, celebrate your ***big*** year by earning a trip to Costa del Sol, Spain or Cancun, Mexico.

For more information on how you can have a big year in 1984 as a Comfortmaker dealer, just mail us the coupon today!

To: CLIMATE CONTROL
A UNIT OF SNYDER GENERAL CORPORATION
Bldg. A, 401 Randolph Street,
Red Bud, Illinois 62278-1098

☐ Please send me complete information on being a Comfortmaker dealer.

☐ Please have your representative call me.

Name ____________________

Company ____________________

Address ____________________

City __________ State __________ Zip Code __________

Telephone (   ) ____________________

CLIMATE CONTROL
A UNIT OF SNYDER GENERAL CORPORATION

Circle 13 on Reader Action Card

Tampa, Fla.

Housing units	718,220
Central cooling	56%
Room units	29%
Home heating system	
Warm air furnace	40%
Hydronic	1%
Heat pump	17%
Other/none	42%
Home heating fuel	
Gas	7%
Fuel oil	17%
Electricity	63%
Bottled/tank/LP	9%
Other/none	4%
Age of heating system	
430,502 single family detached	
0-3 years	17%
4-10 years	27%
11-20 years	29%
21-40 years	9%
41+ years	18%

West Palm Beach, Fla.

Housing units	286,784
Central cooling	65%
Room units	24%
Home heating system	
Warm air furnace	34%
Hydronic	1%
Heat pump	20%
Other/none	45%
Home heating fuel	
Gas	8%
Fuel oil	1%
Electricity	78%
Bottled/tank/LP	8%
Other/none	5%
Age of heating system	
126,084 single family detached	
0-3 years	19%
4-10 years	30%
11-20 years	19%
21-40 years	5%
41+ years	27%

Atlanta, Ga.

Housing units	768,247
Central cooling	54%
Room units	19%
Home heating system	
Warm air furnace	71%
Hydronic	3%
Heat pump	3%
Other/none	23%
Home heating fuel	
Gas	74%
Fuel oil	1%
Electricity	17%
Bottled/tank/LP	6%
Other/none	2%
Age of heating system	
467,247 single family detached	
0-3 years	22%
4-10 years	19%
11-20 years	24%
21-40 years	14%
41+ years	21%

Streamline

Refrigeration Access Valves

For Complete System Service

Mueller's new line of Refrigeration Access Valves are designed to offer convenient low cost access ports for refrigeration service.

They can be installed in any position on either high or low side for quick testing, pressure checking, purging or charging. All fittings feature ¼ inch SAE male flare access ports and each valve is furnished with a unique retaining strap to prevent loss or misplacement of the seal cap.

See your Mueller wholesaler or write for specs: Mueller Brass Co., P.O. Box 1157, Hendersonville, TN 37075

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A Subsidiary of Sharon Steel Corp.
AN NVF COMPANY NYSE

Circle 40 on Reader Action Card

Augusta, Ga.

Housing units	118,485
Central cooling	47%
Room units	30%

Home heating system

Warm air furnace	53%
Hydronic	—
Heat pump	5%
Other/none	42%

Home heating fuel

Gas	62%
Fuel oil	3%
Electricity	22%
Bottled/tank/LP	9%
Other/none	4%

Age of heating system

84,714 single family detached

0-3 years	15%
4-10 years	22%
11-20 years	20%
21-40 years	6%
41+ years	37%

Columbus, Ga.

Housing units	84,817
Central cooling	42%
Room units	31%

Home heating system

Warm air furnace	54%
Hydronic	2%
Heat pump	3%
Other/none	41%

Home heating fuel

Gas	76%
Fuel oil	—
Electricity	15%
Bottled/tank/LP	8%
Other/none	1%

1970 - 1980 growth

Single family homes	8,062
Multifamily homes	3,849
Centrally cooled homes	21,675
Warm air furnaces	17,123
Hydronic systems	—

Macon, Ga.

Housing units	91,914
Central cooling	42%
Room units	34%

Home heating system

Warm air furnace	48%
Hydronic	2%
Heat pump	3%
Other/none	47%

Home heating fuel

Gas	64%
Fuel oil	—
Electricity	22%
Bottled/tank/LP	9%
Other/none	5%

1970 - 1980 growth

Single family homes	20,607
Multifamily homes	4,842
Centrally cooled homes	25,569
Warm air furnaces	23,261
Hydronic systems	—

Savannah, Ga.

Housing units	86,542
Central cooling	41%
Room units	32%

Home heating system

Warm air furnace	47%
Hydronic	2%
Heat pump	6%
Other/none	45%

Home heating fuel

Gas	50%
Fuel oil	5%
Electricity	20%
Bottled/tank/LP	12%
Other/none	13%

1970 - 1980 growth

Single family homes	17,174
Multifamily homes	7,703
Centrally cooled homes	24,076
Warm air furnaces	18,825
Hydronic systems	—

Honolulu, Hawaii

Housing units	250,864
Central cooling	6%
Room units	14%

Home heating system

Warm air furnace	—
Hydronic	5%
Heat pump	1%
Other/none	94%

Home heating fuel

Gas	5%
Fuel oil	—
Electricity	4%
Bottled/tank/LP	—
Other/none	91%

1970 - 1980 growth

Single family homes	15,864
Multifamily homes	60,950
Centrally cooled homes	14,807
Warm air furnaces	1,257
Hydronic systems	13,828

Boise, Idaho

Housing units	67,795
Central cooling	37%
Room units	22%

Home heating system

Warm air furnace	55%
Hydronic	3%
Heat pump	10%
Other/none	32%

Home heating fuel

Gas	40%
Fuel oil	14%
Electricity	37%
Bottled/tank/LP	2%
Other/none	7%

1970 - 1980 growth

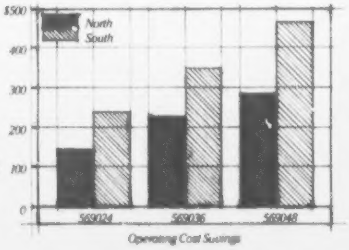
Single family homes	21,094
Multifamily homes	9,582
Centrally cooled homes	20,424
Warm air furnaces	12,478
Hydronic systems	—

Our premium condensing unit will help you dig deeper into the high efficiency market.

A 9 SEER unit fills in our high efficiency line.

With the addition of the new 569D, our high efficiency line is complete. We now offer 8-, 9-, and 10-SEER units to fit every type of high efficiency customer.

The 569D strikes a perfect balance between economy and efficiency. It's nearly as economical as our 8 SEER unit, yet it can save your customers up to $100 more each year. And it offers many premium features formerly only available on our 10 SEER unit.



4-year operating cost savings of three Bryant air conditioners rated at 9.2 SEER. Compared to equivalent capacity units rated at 8.0 SEER. Electric rate, $.08 kwhr, increased 10% each year. 1,000 operating hours per season in Northern regions, 1600 hours Southern regions.

Built with deluxe features as standard equipment.

The 569D has a Low Pressure Switch to provide constant "loss of charge" protection. This feature will never allow the unit to operate without a sufficient level of refrigerant.

Our crankcase heater is thermostatically controlled

so it only operates when necessary (when the outside temperature falls below 60°). Saving energy. And wear and tear on the system.

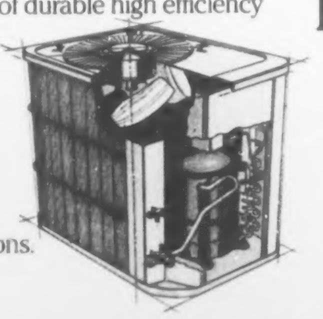
The Filter-Drier works to protect the unit by keeping contaminants out of the refrigeration system. And moisture out of the compressor.

Other features of the 569D are an isolated compressor compartment and brass service valves. As well as extra hard coil fins and a zinc-coated steel cabinet with a baked enamel finish for a more durable outside.

We're a strong foundation for your growing business.

Of course, a complete line of durable high efficiency units at competitive prices is a good foundation for a profitable business.

That's why we make the 569D in sizes from 2 to 5 tons; the model 565 with a rating of 8+ SEER in sizes from 1 to 5 tons; and the 10 SEER rated model 568 in sizes from 2 to 5 tons.



But being a Bryant dealer means even more. We help your business grow. With installation and service training, cooperative advertising dollars, and other dealer support programs. Plus, our complete parts program provides all the parts and technical assistance you'll need to provide fast and reliable service.

So call your Bryant representative today. To see a brochure for our 569D, or the complete line. And really dig your heels into the high efficiency market.

It really does pay to be a Bryant Dealer.

bryant®

Circle 8 on Reader Action Card

Illinois - Indiana

Champaign, Ill.

Housing units	62,491
Central cooling	37%
Room units	35%

Home heating system

Warm air furnace	71%
Hydronic	11%
Heat pump	2%
Other/none	16%

Home heating fuel

Gas	78%
Fuel oil	5%
Electricity	12%
Bottled/tank/LP	3%
Other/none	2%

1970 - 1980 growth

Single family homes	6,673
Multifamily homes	6,619
Centrally cooled homes	16,011
Warm air furnaces	10,410
Hydronic systems	3,353

Chicago, Ill.

Housing units	2,636,120
Central cooling	30%
Room units	34%

Home heating system

Warm air furnace	52%
Hydronic	35%
Heat pump	1%
Other/none	12%

Home heating fuel

Gas	87%
Fuel oil	4%
Electricity	7%
Bottled/tank/LP	1%
Other/none	1%

Age of heating system

1,196,136 single family detached

0-3 years	13%
4-10 years	24%
11-20 years	27%
21-40 years	18%
41+ years	18%

Peoria, Ill.

Housing units	139,681
Central cooling	42%
Room units	32%

Home heating system

Warm air furnace	77%
Hydronic	8%
Heat pump	4%
Other/none	1%

Home heating fuel

Gas	77%
Fuel oil	2%
Electricity	14%
Bottled/tank/LP	5%
Other/none	2%

Age of heating system

104,210 single family detached

0-3 years	20%
4-10 years	18%
11-20 years	14%
21-40 years	18%
41+ years	30%

Rockford, Ill.

Housing units	103,171
Central cooling	26%
Room units	35%

Home heating system

Warm air furnace	78%
Hydronic	11%
Heat pump	1%
Other/none	10%

Home heating fuel

Gas	81%
Fuel oil	10%
Electricity	6%
Bottled/tank/LP	1%
Other/none	2%

1970 - 1980 growth

Single family homes	13,188
Multifamily homes	965
Centrally cooled homes	18,674
Warm air furnaces	13,231
Hydronic systems	—

Springfield, Ill.

Housing units	77,388
Central cooling	50%
Room units	34%

Home heating system

Warm air furnace	76%
Hydronic	10%
Heat pump	2%
Other/none	12%

Home heating fuel

Gas	74%
Fuel oil	2%
Electricity	13%
Bottled/tank/LP	7%
Other/none	6%

1970 - 1980 growth

Single family homes	13,064
Multifamily homes	7,419
Centrally cooled homes	26,129
Warm air furnaces	17,559
Hydronic systems	—

Evansville, Ind.

Housing units	120,373
Central cooling	48%
Room units	33%

Home heating system

Warm air furnace	69%
Hydronic	4%
Heat pump	5%
Other/none	22%

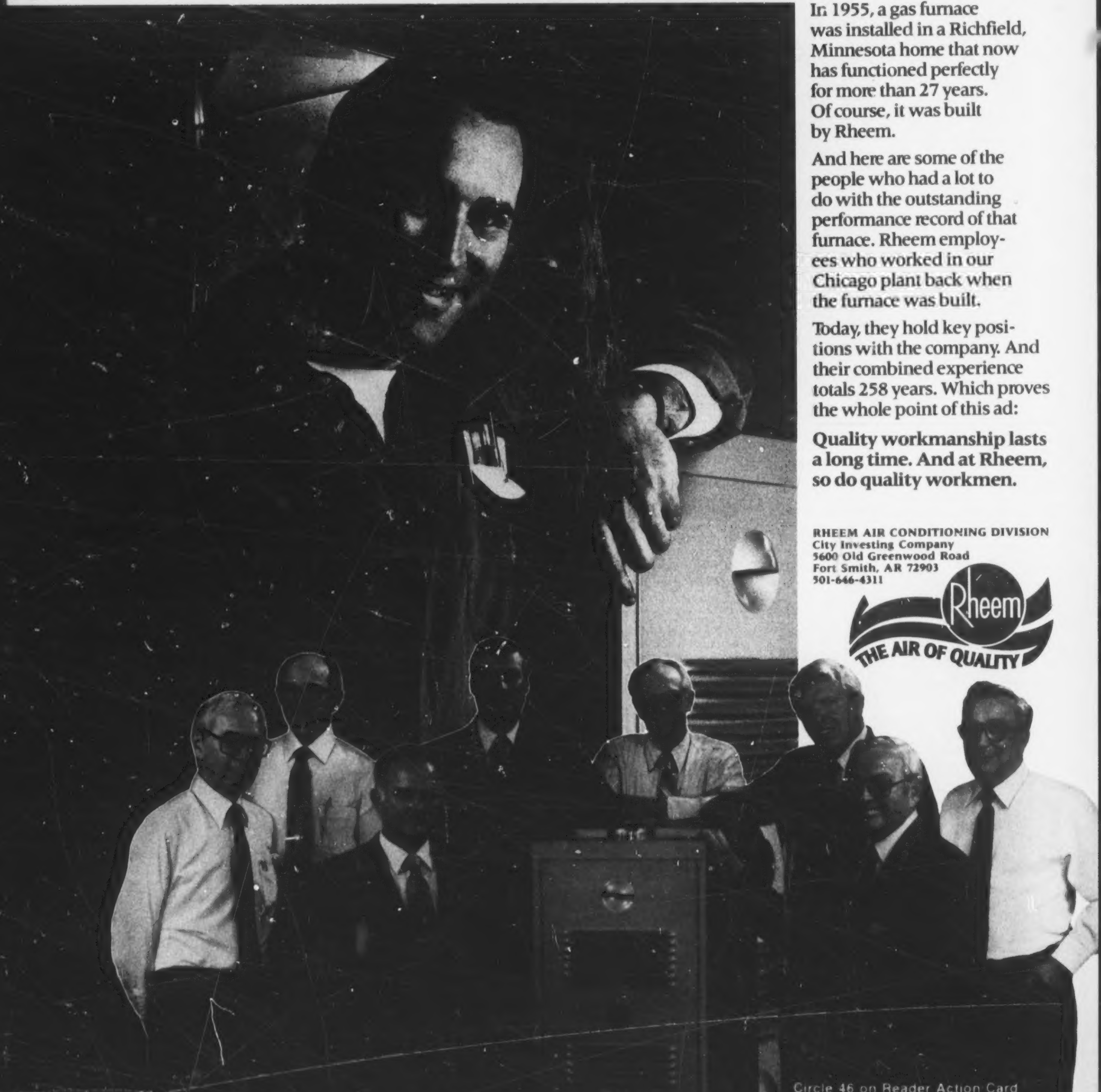
Home heating fuel

Gas	69%
Fuel oil	4%
Electricity	16%
Bottled/tank/LP	9%
Other/none	2%

1970 - 1980 growth

Single family homes	28,244
Multifamily homes	12,956
Centrally cooled homes	41,517
Warm air furnaces	29,322
Hydronic systems	2,015

The Air of Quality is a Lasting Experience.



In 1955, a gas furnace was installed in a Richfield, Minnesota home that now has functioned perfectly for more than 27 years. Of course, it was built by Rheem.

And here are some of the people who had a lot to do with the outstanding performance record of that furnace. Rheem employees who worked in our Chicago plant back when the furnace was built.

Today, they hold key positions with the company. And their combined experience totals 258 years. Which proves the whole point of this ad:

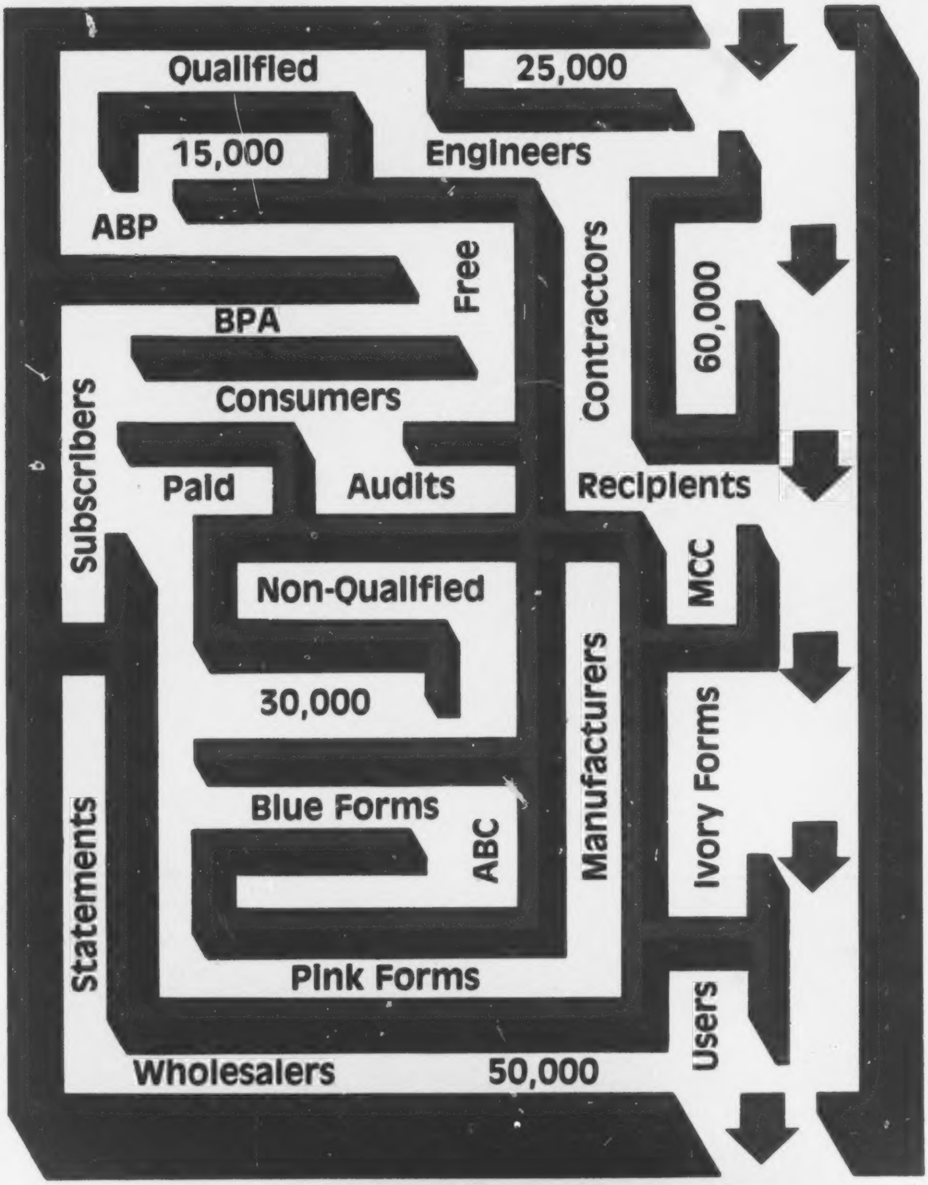
Quality workmanship lasts a long time. And at Rheem, so do quality workmen.

RHEEM AIR CONDITIONING DIVISION
City Investing Company
5600 Old Greenwood Road
Fort Smith, AR 72903
501-646-4311

Rheem
THE AIR OF QUALITY

Circle 46 on Reader Action Card

CUT THROUGH THE MAZE OF CIRCULATION CLAIMS



THE
AIR CONDITIONING,
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THE INDUSTRY WEEKLY

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P.O. Box 2600, Troy, Michigan 48007, (313) 362-3700 Telex: 23-0295

Fort Wayne, Ind.

Housing units	142,457
Central cooling	23%
Room units	30%

Home heating system

Warm air furnace	63%
Hydronic	11%
Heat pump	3%
Other/none	23%

Home heating fuel

Gas	64%
Fuel oil	10%
Electricity	21%
Bottled/tank/LP	3%
Other/none	2%

Age of heating system
105,128 single family detached

0-3 years	14%
4-10 years	33%
11-20 years	27%
21-40 years	11%
41+ years	15%

Gary, Ind.

Housing units	227,200
Central cooling	32%
Room units	33%

Home heating system

Warm air furnace	73%
Hydronic	22%
Heat pump	1%
Other/none	4%

Home heating fuel

Gas	85%
Fuel oil	6%
Electricity	6%
Bottled/tank/LP	2%
Other/none	1%

Age of heating system
152,778 single family detached

0-3 years	9%
4-10 years	25%
11-20 years	24%
21-40 years	8%
41+ years	34%

Indianapolis, Ind.

Housing units	450,595
Central cooling	43%
Room units	23%

Home heating system

Warm air furnace	72%
Hydronic	6%
Heat pump	5%
Other/none	17%

Home heating fuel

Gas	61%
Fuel oil	16%
Electricity	18%
Bottled/tank/LP	3%
Other/none	2%

Age of heating system
295,464 single family detached

0-3 years	16%
4-10 years	23%
11-20 years	31%
21-40 years	13%
41+ years	17%

Lafayette, Ind.

Housing units	53,083
Central cooling	64%
Room units	24%

Home heating system

Warm air furnace	62%
Hydronic	—
Heat pump	4%
Other/none	34%

Home heating fuel

Gas	62%
Fuel oil	—
Electricity	34%
Bottled/tank/LP	4%
Other/none	—

1970 - 1980 growth

Single family homes	11,028
Multifamily homes	9,998
Centrally cooled homes	23,507
Warm air furnaces	19,438
Hydronic systems	—

South Bend, Ind.

Housing units	105,964
Central cooling	27%
Room units	27%

Home heating system

Warm air furnace	78%
Hydronic	7%
Heat pump	2%
Other/none	13%

Home heating fuel

Gas	75%
Fuel oil	10%
Electricity	11%
Bottled/tank/LP	2%
Other/none	2%

Age of heating system
82,552 single family detached

0-3 years	9%
4-10 years	31%
11-20 years	23%
21-40 years	19%
41+ years	18%

Terre Haute, Ind.

Housing units	69,291
Central cooling	30%
Room units	35%

Home heating system

Warm air furnace	68%
Hydronic	6%
Heat pump	3%
Other/none	23%

Home heating fuel

Gas	53%
Fuel oil	17%
Electricity	17%
Bottled/tank/LP	9%
Other/none	4%

1970 - 1980 growth

Single family homes	2,608
Multifamily homes	4,802
Centrally cooled homes	14,790
Warm air furnaces	6,600
Hydronic systems	—

Cedar Rapids, Iowa

Housing units	53,140
Central cooling	39%
Room units	32%

Home heating system	
Warm air furnace	81%
Hydronic	9%
Heat pump	1%
Other/none	9%

Home heating fuel	
Gas	92%
Fuel oil	—
Electricity	6%
Bottled/tank/LP	—
Other/none	2%

1970 - 1980 growth	
Single family homes	6,668
Multifamily homes	4,037
Centrally cooled homes	17,143
Warm air furnaces	7,996
Hydronic systems	716

Davenport, Iowa

Housing units	144,699
Central cooling	38%
Room units	35%

Home heating system	
Warm air furnace	81%
Hydronic	12%
Heat pump	—
Other/none	7%

Home heating fuel	
Gas	88%
Fuel oil	2%
Electricity	4%
Bottled/tank/LP	4%
Other/none	2%

Age of heating system 102,206 single family detached	
0-3 years	13%
4-10 years	35%
11-20 years	17%
21-40 years	21%
41+ years	14%

Des Moines, Iowa

Housing units	134,210
Central cooling	45%
Room units	32%

Home heating system	
Warm air furnace	78%
Hydronic	10%
Heat pump	4%
Other/none	8%

Home heating fuel	
Gas	81%
Fuel oil	2%
Electricity	10%
Bottled/tank/LP	5%
Other/none	2%

Age of heating system 91,945 single family detached	
0-3 years	19%
4-10 years	24%
11-20 years	24%
21-40 years	14%
41+ years	19%

Topeka, Kan.

Housing units	76,088
Central cooling	47%
Room units	33%

Home heating system	
Warm air furnace	72%
Hydronic	5%
Heat pump	1%
Other/none	22%

Home heating fuel	
Gas	82%
Fuel oil	—
Electricity	12%
Bottled/tank/LP	3%
Other/none	3%

1970 - 1980 growth	
Single family homes	17,851
Multifamily homes	6,316
Centrally cooled homes	24,250
Warm air furnaces	19,705
Hydronic systems	887

Wichita, Kan.

Housing units	162,739
Central cooling	53%
Room units	33%

Home heating system	
Warm air furnace	69%
Hydronic	2%
Heat pump	2%
Other/none	27%

Home heating fuel	
Gas	80%
Fuel oil	—
Electricity	15%
Bottled/tank/LP	4%
Other/none	1%

Age of heating system 113,468 single family detached	
0-3 years	22%
4-10 years	19%
11-20 years	26%
21-40 years	15%
41+ years	18%

Lexington, Ky.

Housing units	122,454
Central cooling	38%
Room units	27%

Home heating system	
Warm air furnace	56%
Hydronic	4%
Heat pump	9%
Other/none	31%

Home heating fuel	
Gas	62%
Fuel oil	3%
Electricity	26%
Bottled/tank/LP	4%
Other/none	5%

1970 - 1980 growth	
Single family homes	40,564
Multifamily homes	22,403
Centrally cooled homes	36,057
Warm air furnaces	27,785
Hydronic systems	1,659

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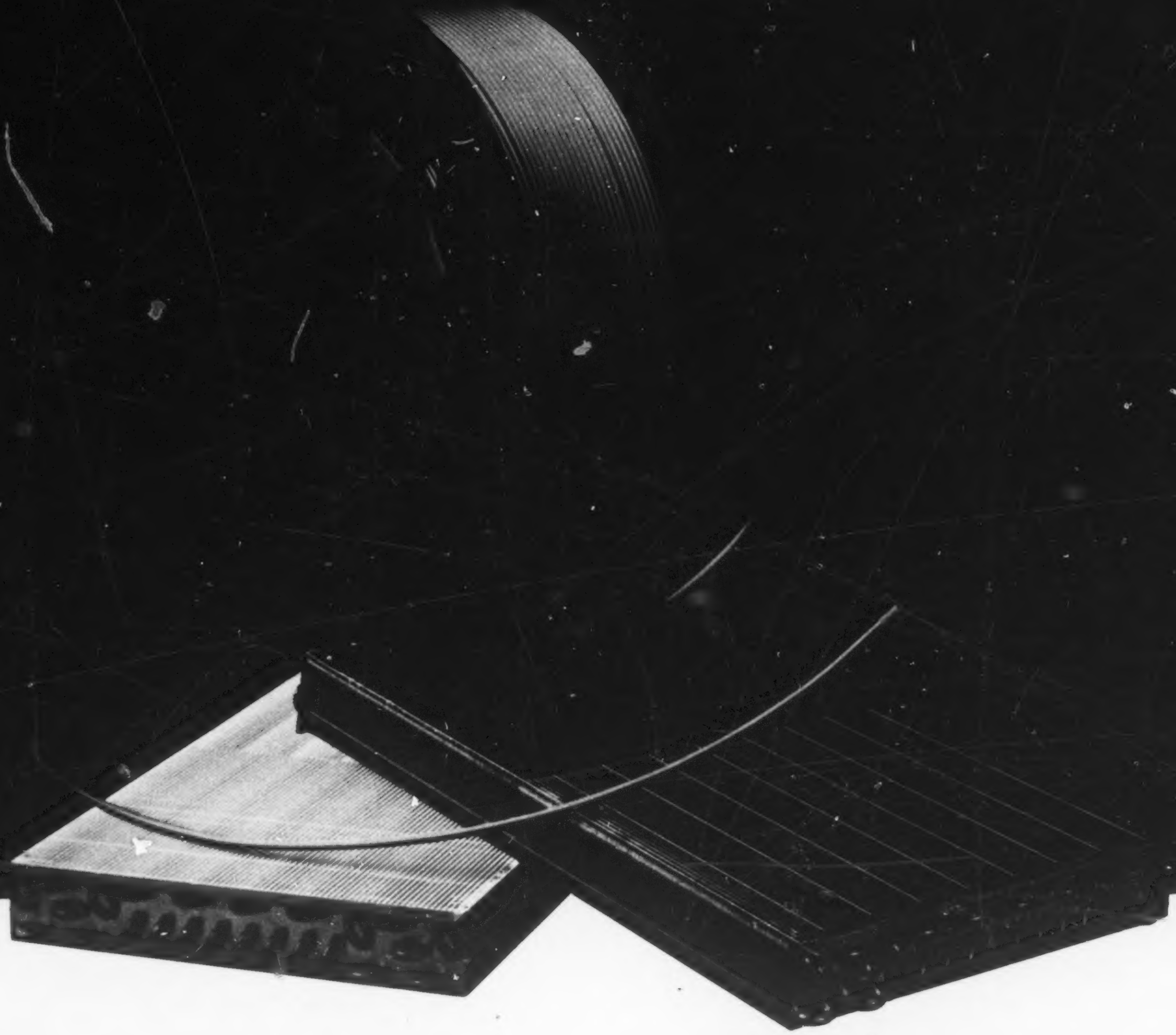

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AB 2

Circle 3 on Reader Action Card

Louisville, Ky.

Housing units	343,736
Central cooling	46%
Room units	32%

Home heating system

Warm air furnace	71%
Hydronic	6%
Heat pump	6%
Other/none	17%

Home heating fuel

Gas	75%
Fuel oil	5%
Electricity	15%
Bottled/tank/LP	3%
Other/none	2%

Age of heating system
288,645 single family detached

0-3 years	15%
4-10 years	24%
11-20 years	31%
21-40 years	13%
41+ years	27%

Baton Rouge, La.

Housing units	177,151
Central cooling	57%
Room units	33%

Home heating system

Warm air furnace	61%
Hydronic	2%
Heat pump	2%
Other/none	35%

Home heating fuel

Gas	68%
Fuel oil	—
Electricity	27%
Bottled/tank/LP	3%
Other/none	2%

Age of heating system
123,441 single family detached

0-3 years	7%
4-10 years	28%
11-20 years	10%
21-40 years	13%
41+ years	42%

Lake Charles, La.

Housing units	60,712
Central cooling	47%
Room units	42%

Home heating system

Warm air furnace	52%
Hydronic	—
Heat pump	2%
Other/none	46%

Home heating fuel

Gas	73%
Fuel oil	—
Electricity	21%
Bottled/tank/LP	5%
Other/none	1%

1970 - 1980 growth

Single family homes	6,528
Multifamily homes	8,698
Centrally cooled homes	19,612
Warm air furnaces	15,969
Hydronic systems	—

New Orleans, La.

Housing units	453,816
Central cooling	50%
Room units	36%

Home heating system

Warm air furnace	52%
Hydronic	3%
Heat pump	2%
Other/none	43%

Home heating fuel

Gas	74%
Fuel oil	—
Electricity	23%
Bottled/tank/LP	2%
Other/none	1%

Age of heating system
242,353 single family detached

0-3 years	16%
4-10 years	24%
11-20 years	23%
21-40 years	17%
41+ years	20%

Shreveport, La.

Housing units	143,912
Central cooling	46%
Room units	36%

Home heating system

Warm air furnace	53%
Hydronic	1%
Heat pump	2%
Other/none	44%

Home heating fuel

Gas	78%
Fuel oil	—
Electricity	16%
Bottled/tank/LP	3%
Other/none	3%

Age of heating system
105,518 single family detached

0-3 years	10%
4-10 years	17%
11-20 years	21%
21-40 years	12%
41+ years	40%

Portland, Maine

Housing units	72,178
Central cooling	1%
Room units	14%

Home heating system

Warm air furnace	19%
Hydronic	56%
Heat pump	1%
Other/none	24%

Home heating fuel

Gas	6%
Fuel oil	75%
Electricity	13%
Bottled/tank/LP	—
Other/none	6%

1970 - 1980 growth

Single family homes	15,330
Multifamily homes	8,652
Centrally cooled homes	543
Warm air furnaces	4,327
Hydronic systems	6,285

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- **Morning on CBS**
- **CBS Evening News with Dan Rather**
- **Good Morning America**
- **This Morning**
- **Nightline with Ted Koppel**

HEIL

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Baltimore, Md.

Housing units	796,229
Central cooling	35%
Room units	31%

Home heating system

Warm air furnace	53%
Hydronic	28%
Heat pump	5%
Other/none	14%

Home heating fuel

Gas	49%
Fuel oil	37%
Electricity	12%
Bottled/tank/LP	1%
Other/none	1%

Age of heating system

315,455 single family detached

0-3 years	15%
4-10 years	11%
11-20 years	20%
21-40 years	25%
41+ years	29%

Boston, Mass.

Housing units	1,038,139
Central cooling	6%
Room units	36%

Home heating system

Warm air furnace	25%
Hydronic	60%
Heat pump	1%
Other/none	14%

Home heating fuel

Gas	33%
Fuel oil	57%
Electricity	8%
Bottled/tank/LP	—
Other/none	2%

Age of heating system

455,942 single family detached

0-3 years	15%
4-10 years	11%
11-20 years	29%
21-40 years	27%
41+ years	18%

Brockton, Mass.

Housing units	58,167
Central cooling	5%
Room units	34%

Home heating system

Warm air furnace	26%
Hydronic	53%
Heat pump	2%
Other/none	19%

Home heating fuel

Gas	25%
Fuel oil	62%
Electricity	11%
Bottled/tank/LP	—
Other/none	2%

1970 - 1980 growth

Single family homes	1,878
Multifamily homes	3,497
Centrally cooled homes	2,523
Warm air furnaces	3,503
Hydronic systems	1,878

Fall River, Mass.

Housing units	66,464
Central cooling	1%
Room units	21%

Home heating system

Warm air furnace	15%
Hydronic	47%
Heat pump	1%
Other/none	37%

Home heating fuel

Gas	47%
Fuel oil	40%
Electricity	8%
Bottled/tank/LP	—
Other/none	5%

1970 - 1980 growth

Single family homes	14,610
Multifamily homes	5,304
Centrally cooled homes	806
Warm air furnaces	11,099
Hydronic systems	14,610

Lawrence, Mass.

Housing units	104,486
Central cooling	4%
Room units	38%

Home heating system

Warm air furnace	21%
Hydronic	56%
Heat pump	1%
Other/none	22%

Home heating fuel

Gas	37%
Fuel oil	49%
Electricity	10%
Bottled/tank/LP	2%
Other/none	2%

1970 - 1980 growth

Single family homes	17,897
Multifamily homes	8,730
Centrally cooled homes	3,992
Warm air furnaces	7,630
Hydronic systems	10,144

Lowell, Mass.

Housing units	77,354
Central cooling	4%
Room units	40%

Home heating system

Warm air furnace	28%
Hydronic	49%
Heat pump	1%
Other/none	22%

Home heating fuel

Gas	54%
Fuel oil	35%
Electricity	8%
Bottled/tank/LP	—
Other/none	3%

1970 - 1980 growth

Single family homes	10,678
Multifamily homes	4,190
Centrally cooled homes	2,672
Warm air furnaces	5,610
Hydronic systems	6,554

New Bedford, Mass.

Housing units	64,298
Central cooling	3%
Room units	19%

Home heating system

Warm air furnace	25%
Hydronic	42%
Heat pump	—
Other/none	33%

Home heating fuel

Gas	52%
Fuel oil	39%
Electricity	5%
Bottled/tank/LP	1%
Other/none	3%

1970 - 1980 growth

Single family homes	9,293
Multifamily homes	2,184
Centrally cooled homes	1,940
Warm air furnaces	6,408
Hydronic systems	3,967

Springfield, Mass.

Housing units	196,348
Central cooling	6%
Room units	38%

Home heating system

Warm air furnace	28%
Hydronic	47%
Heat pump	2%
Other/none	23%

Home heating fuel

Gas	30%
Fuel oil	51%
Electricity	14%
Bottled/tank/LP	—
Other/none	5%

Age of heating system
107,845 single family detached

0-3 years	6%
4-10 years	24%
11-20 years	28%
21-40 years	32%
41+ years	10%

Worcester, Mass.

Housing units	136,383
Central cooling	4%
Room units	25%

Home heating system

Warm air furnace	18%
Hydronic	54%
Heat pump	1%
Other/none	27%

Home heating fuel

Gas	31%
Fuel oil	53%
Electricity	12%
Bottled/tank/LP	1%
Other/none	3%

1970 - 1980 growth

Single family homes	15,413
Multifamily homes	12,945
Centrally cooled homes	4,571
Warm air furnaces	7,336
Hydronic systems	7,923

Ann Arbor, Mich.

Housing units	97,397
Central cooling	25%
Room units	24%

Home heating system

Warm air furnace	74%
Hydronic	16%
Heat pump	1%
Other/none	9%

Home heating fuel

Gas	78%
Fuel oil	12%
Electricity	7%
Bottled/tank/LP	2%
Other/none	1%

1970 - 1980 growth

Single family homes	9,010
Multifamily homes	16,976
Centrally cooled homes	17,552
Warm air furnaces	23,325
Hydronic systems	2,471

Detroit, Mich.

Housing units	1,588,465
Central cooling	20%
Room units	25%

Home heating system

Warm air furnace	75%
Hydronic	14%
Heat pump	—
Other/none	11%

Home heating fuel

Gas	89%
Fuel oil	6%
Electricity	4%
Bottled/tank/LP	—
Other/none	1%

Age of heating system
1,090,380 single family detached

0-3 years	13%
4-10 years	19%
11-20 years	29%
21-40 years	19%
41+ years	20%

Flint, Mich.

Housing units	186,991
Central cooling	13%
Room units	18%

Home heating system

Warm air furnace	79%
Hydronic	10%
Heat pump	—
Other/none	11%

Home heating fuel

Gas	79%
Fuel oil	13%
Electricity	4%
Bottled/tank/LP	2%
Other/none	2%

Age of heating system
141,255 single family detached

0-3 years	16%
4-10 years	21%
11-20 years	23%
21-40 years	14%
41+ years	26%

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The Trane Company—Dealer Products Group—Tyler, Texas 75711

Michigan

Grand Rapids, Mich.

Housing units	216,278
Central cooling	10%
Room units	19%

Home heating system

Warm air furnace	80%
Hydronic	11%
Heat pump	—
Other/none	9%

Home heating fuel

Gas	83%
Fuel oil	10%
Electricity	2%
Bottled/tank/LP	2%
Other/none	3%

Age of heating system

154,518 single family detached

0-3 years	10%
4-10 years	12%
11-20 years	31%
21-40 years	26%
41+ years	21%

Jackson, Mich.

Housing units	53,629
Central cooling	8%
Room units	19%

Home heating system

Warm air furnace	77%
Hydronic	9%
Heat pump	1%
Other/none	13%

Home heating fuel

Gas	72%
Fuel oil	16%
Electricity	4%
Bottled/tank/LP	4%
Other/none	4%

1970 - 1980 growth

Single family homes	6,121
Multifamily homes	3,473
Centrally cooled homes	3,742
Warm air furnaces	7,612
Hydronic systems	836

Kalamazoo, Mich.

Housing units	104,801
Central cooling	14%
Room units	21%

Home heating system

Warm air furnace	73%
Hydronic	11%
Heat pump	1%
Other/none	15%

Home heating fuel

Gas	65%
Fuel oil	6%
Electricity	22%
Bottled/tank/LP	3%
Other/none	4%

1970 - 1980 growth

Single family homes	26,772
Multifamily homes	16,020
Centrally cooled homes	12,480
Warm air furnaces	28,971
Hydronic systems	4,449

Lansing, Mich.

Housing units	166,484
Central cooling	14%
Room units	22%

Home heating system

Warm air furnace	73%
Hydronic	11%
Heat pump	1%
Other/none	15%

Home heating fuel

Gas	69%
Fuel oil	17%
Electricity	6%
Bottled/tank/LP	3%
Other/none	5%

Age of heating system

112,135 single family detached

0-3 years	17%
4-10 years	19%
11-20 years	23%
21-40 years	18%
41+ years	23%

Muskegon, Mich.

Housing units	66,040
Central cooling	5%
Room units	9%

Home heating system

Warm air furnace	70%
Hydronic	9%
Heat pump	—
Other/none	21%

Home heating fuel

Gas	77%
Fuel oil	13%
Electricity	3%
Bottled/tank/LP	5%
Other/none	2%

1970 - 1980 growth

Single family homes	11,919
Multifamily homes	4,897
Centrally cooled homes	2,015
Warm air furnaces	13,744
Hydronic systems	2,199

Saginaw, Mich.

Housing units	79,436
Central cooling	11%
Room units	20%

Home heating system

Warm air furnace	71%
Hydronic	13%
Heat pump	—
Other/none	16%

Home heating fuel

Gas	76%
Fuel oil	13%
Electricity	5%
Bottled/tank/LP	3%
Other/none	3%

1970 - 1980 growth

Single family homes	8,510
Multifamily homes	5,266
Centrally cooled homes	7,394
Warm air furnaces	14,495
Hydronic systems	553

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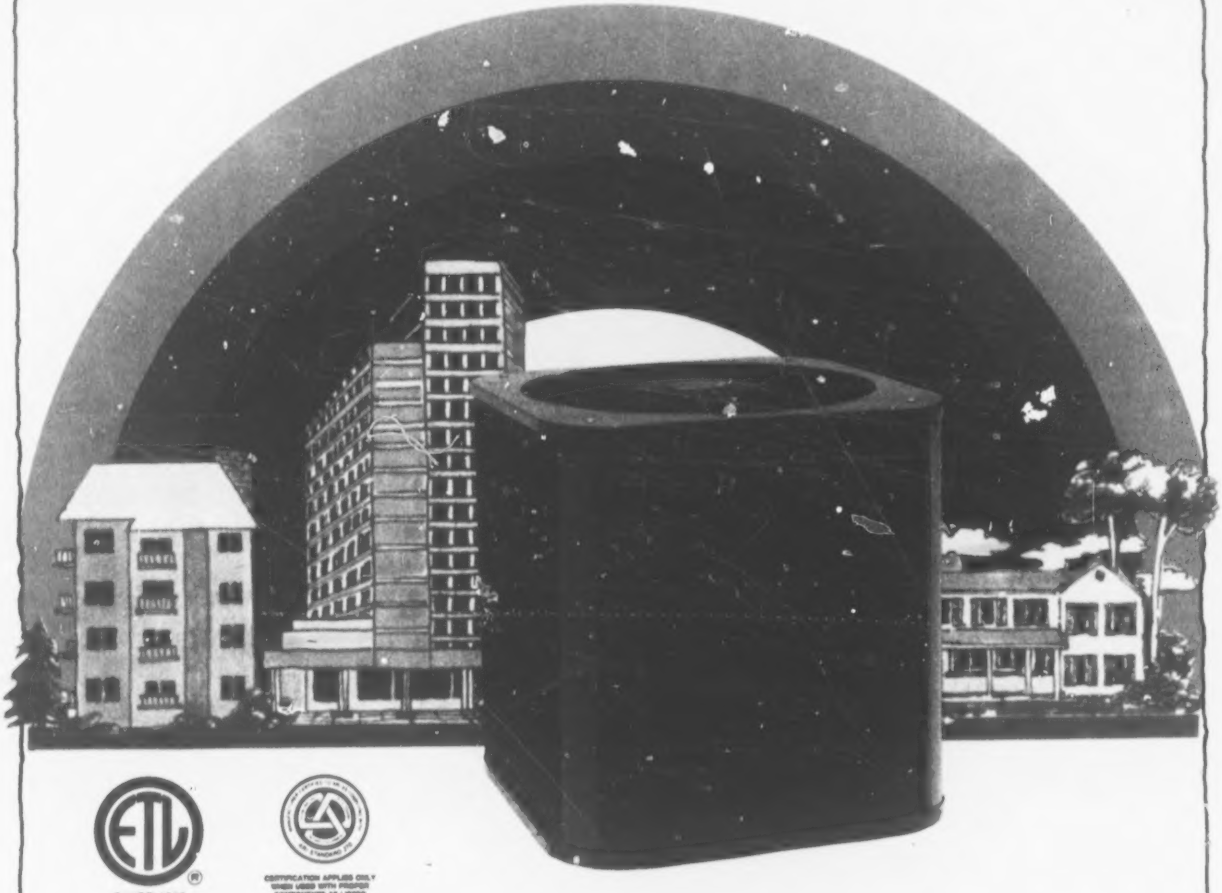

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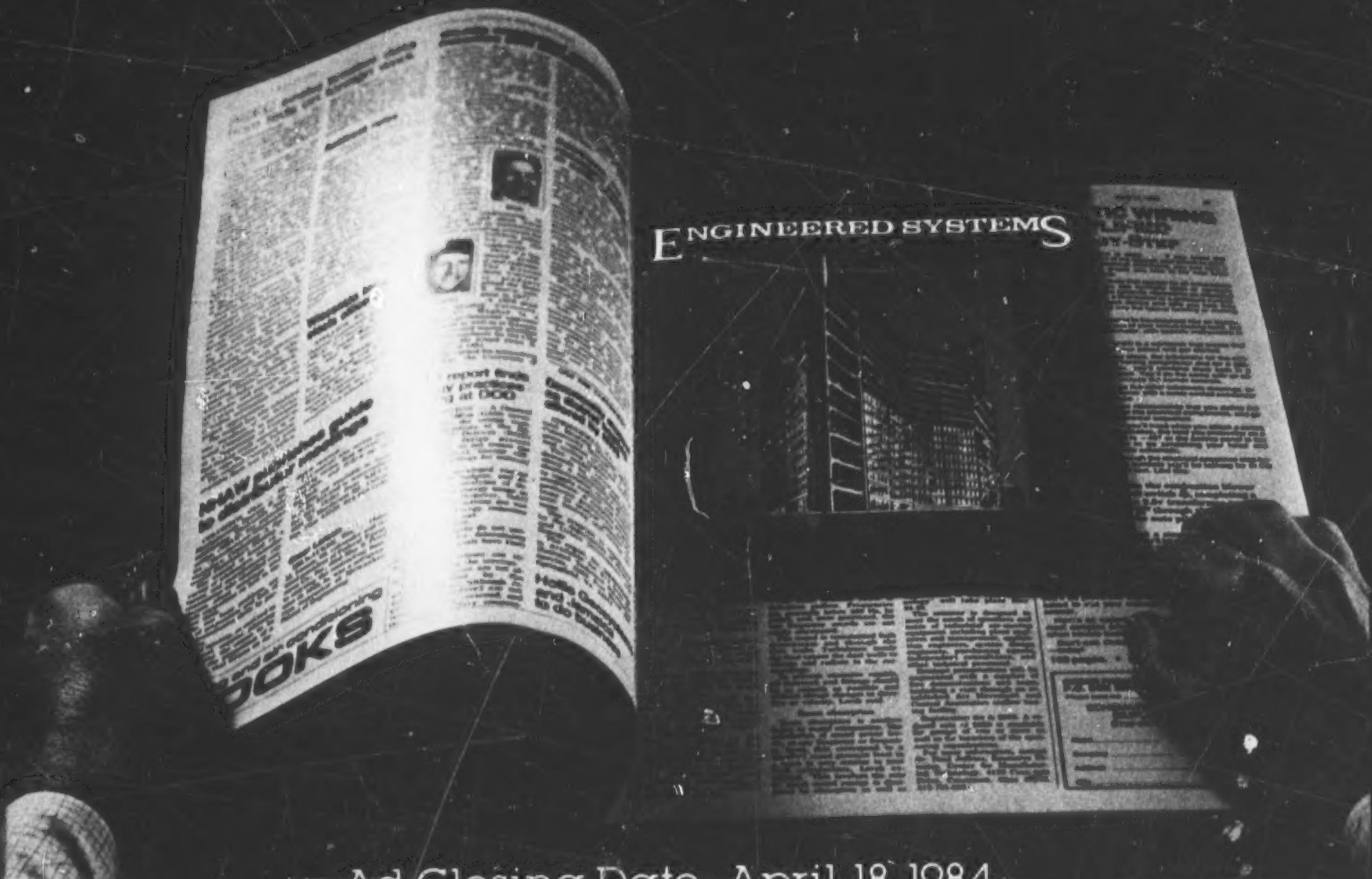
THE INDUSTRY WEEKLY



Ad Closing Date: April 18, 1984
Publishing Date: May 21, 1984
(Includes a special Reader Action Card)

Minnesota - Missouri

Duluth, Minn.

Housing units	104,477
Central cooling	1%
Room units	7%

Home heating system

Warm air furnace	51%
Hydronic	30%
Heat pump	1%
Other/none	18%

Home heating fuel

Gas	27%
Fuel oil	50%
Electricity	6%
Bottled/tank/LP	7%
Other/none	10%

Age of heating system

71,137 single family detached

0-3 years	7%
4-10 years	17%
11-20 years	34%
21-40 years	16%
41+ years	26%

Minneapolis, Minn.

Housing units	791,311
Central cooling	25%
Room units	37%

Home heating system

Warm air furnace	62%
Hydronic	29%
Heat pump	1%
Other/none	8%

Home heating fuel

Gas	82%
Fuel oil	12%
Electricity	4%
Bottled/tank/LP	1%
Other/none	1%

Age of heating system

489,772 single family detached

0-3 years	15%
4-10 years	17%
11-20 years	23%
21-40 years	28%
41+ years	17%

Biloxi, Miss.

Housing units	72,634
Central cooling	50%
Room units	31%

Home heating system

Warm air furnace	56%
Hydronic	—
Heat pump	4%
Other/none	40%

Home heating fuel

Gas	60%
Fuel oil	—
Electricity	25%
Bottled/tank/LP	10%
Other/none	5%

1970 - 1980 growth

Single family homes	22.211
Multifamily homes	8,871
Centrally cooled homes	25,534
Warm air furnaces	23,975
Hydronic systems	—

Jackson, Miss.

Housing units	115,408
Central cooling	52%
Room units	29%

Home heating system

Warm air furnace	55%
Hydronic	2%
Heat pump	3%
Other/none	40%

Home heating fuel

Gas	64%
Fuel oil	—
Electricity	25%
Bottled/tank/LP	7%
Other/none	4%

Age of heating system

80,447 single family detached

0-3 years	3%
4-10 years	30%
11-20 years	25%
21-40 years	10%
41+ years	32%

Kansas City, Mo.

Housing units	530,520
Central cooling	51%
Room units	26%

Home heating system

Warm air furnace	81%
Hydronic	8%
Heat pump	1%
Other/none	10%

Home heating fuel

Gas	89%
Fuel oil	1%
Electricity	7%
Bottled/tank/LP	2%
Other/none	1%

Age of heating system

362,402 single family detached

0-3 years	12%
4-10 years	24%
11-20 years	19%
21-40 years	21%
41+ years	24%

St. Louis, Mo.

Housing units	895,539
Central cooling	53%
Room units	27%

Home heating system

Warm air furnace	76%
Hydronic	11%
Heat pump	2%
Other/none	11%

Home heating fuel

Gas	78%
Fuel oil	5%
Electricity	11%
Bottled/tank/LP	5%
Other/none	1%

Age of heating system

589,868 single family detached

0-3 years	12%
4-10 years	21%
11-20 years	32%
21-40 years	18%
41+ years	17%

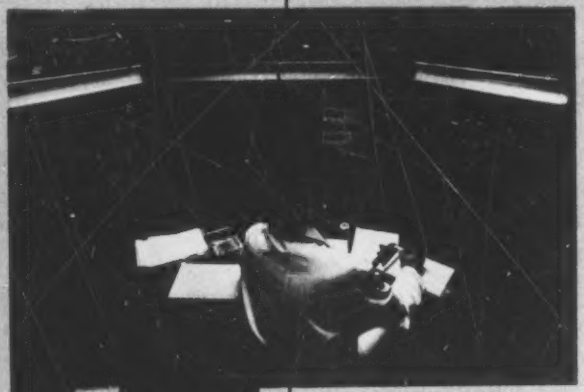
TAKE COMFORT

If you're a dealer or distributor of these quality ARCOAIRE™ units from ARCO Comfort Products Co., you already know the comfort of being part of our family.

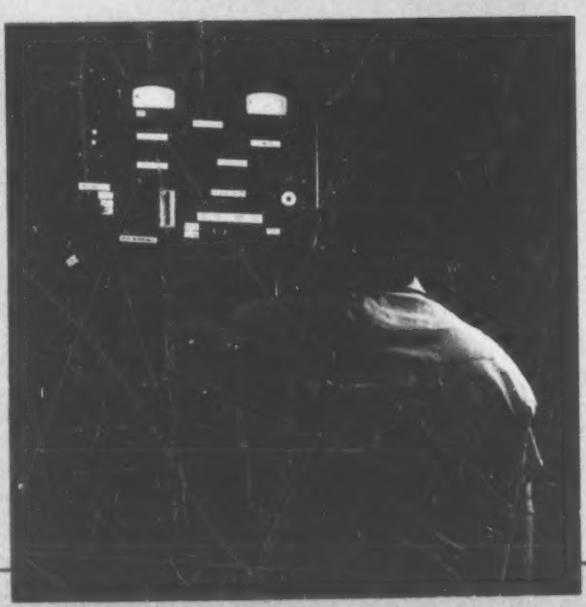
Starting with the comfort of the built-in quality in the full line of ARCOAIRE central heating and cooling equipment, assuring your customers of the performance and efficiency they want, whatever the home or light commercial application. It's quality that's engineered into the complete ARCOAIRE line. It also comes from quality materials, quality manufacturing and quality control.

Then there's the comfort of what we do to serve you properly. Whenever you need it, we put our deep inventory to your advantage and get the product to you fast.

And there's always comfort in the profitability of selling the equipment and features customers are seeking, from ease of installation to energy efficiency. With ongoing ARCOAIRE testing and engineering, we'll anticipate, and create, tomorrow's features, too.



And behind all the comforts of ARCO Comfort Products Co. is a marketing and sales effort aimed at a bigger bottom line for you.



If you're a dealer or distributor of central heating and cooling equipment who's *not* getting all the comforts we deliver, it's time for you to discover ARCO Comfort Products Co. Please call the Sales and Marketing Dept. at (214) 225-7351.

DISCOVER COMFORT.
ARCO Comfort Products Co.
Subsidiary of AtlanticRichfieldCompany

ARCOAIRE
CENTRAL HEATING AND COOLING

302 Nichols Drive
Hutchins, Texas, U.S.A. 75141
Phone: (214) 225-7351

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Circle 5 on Reader Action Card

Missouri - Nevada

Springfield, Mo.

Housing units	83,430
Central cooling	43%
Room units	23%

Home heating system

Warm air furnace	66%
Hydronic	4%
Heat pump	2%
Other/none	28%

Home heating fuel

Gas	74%
Fuel oil	—
Electricity	12%
Bottled/tank/LP	13%
Other/none	1%

1970 - 1980 growth

Single family homes	20,678
Multifamily homes	8,580
Centrally cooled homes	27,357
Warm air furnaces	23,533
Hydronic systems	982

Billings, Mont.

Housing units	42,689
Central cooling	14%
Room units	21%

Home heating system

Warm air furnace	69%
Hydronic	10%
Heat pump	2%
Other/none	19%

Home heating fuel

Gas	85%
Fuel oil	—
Electricity	10%
Bottled/tank/LP	3%
Other/none	2%

1970 - 1980 growth

Single family homes	8,124
Multifamily homes	5,522
Centrally cooled homes	5,309
Warm air furnaces	9,064
Hydronic systems	1,263

Lincoln, Neb.

Housing units	76,327
Central cooling	65%
Room units	25%

Home heating system

Warm air furnace	85%
Hydronic	5%
Heat pump	2%
Other/none	8%

Home heating fuel

Gas	85%
Fuel oil	—
Electricity	10%
Bottled/tank/LP	4%
Other/none	1%

1970 - 1980 growth

Single family homes	11,524
Multifamily homes	7,753
Centrally cooled homes	29,898
Warm air furnaces	16,757
Hydronic systems	—

Omaha, Neb.

Housing units	215,261
Central cooling	60%
Room units	25%

Home heating system

Warm air furnace	85%
Hydronic	6%
Heat pump	2%
Other/none	7%

Home heating fuel

Gas	86%
Fuel oil	3%
Electricity	8%
Bottled/tank/LP	2%
Other/none	1%

Age of heating system

147,659 single family detached

0-3 years	13%
4-10 years	24%
11-20 years	32%
21-40 years	17%
41+ years	14%

Las Vegas, Nev.

Housing units	189,877
Central cooling	84%
Room units	12%

Home heating system

Warm air furnace	63%
Hydronic	—
Heat pump	16%
Other/none	21%

Home heating fuel

Gas	45%
Fuel oil	—
Electricity	54%
Bottled/tank/LP	1%
Other/none	—

Age of heating system

93,802 single family detached

0-3 years	24%
4-10 years	22%
11-20 years	25%
21-40 years	13%
41+ years	16%

Reno, Nev.

Housing units	85,943
Central cooling	21%
Room units	16%

Home heating system

Warm air furnace	67%
Hydronic	6%
Heat pump	2%
Other/none	25%

Home heating fuel

Gas	61%
Fuel oil	18%
Electricity	12%
Bottled/tank/LP	5%
Other/none	4%

1970 - 1980 growth

Single family homes	20,472
Multifamily homes	20,973
Centrally cooled homes	14,434
Warm air furnaces	31,411
Hydronic systems	1,241

an actuator so versatile it's the only one you'll ever need

Choose Your Board. Now you can carry just one base actuator, with a choice of boards to change the electronic signal. So you can customize your actuator to the job... and at the same time cut down on inventory. Nice?

Choose Your Return. You can carry Spring Returns in 25 or 50 in-lbs. torque, and Non-Spring Returns in 35, 75 or 150. So whatever the requirement, it's nice to know you've got plenty of choices.

Johnson Controls new M100 motor actuator fits so many applications, contractors are calling it "the universal actuator." It interchanges with most competitive (and ALL current Johnson Controls) models. And its field-changeable electronic boards allow you to convert quickly to accept a new controller signal. So you can upgrade your control system, in the field without replacing the entire actuator. And best of all, this is probably the quickest and simplest actuator to install of any you've ever seen. The M100 from Johnson Controls! We say it's "application flexible." You'll say

"that's nice, Johnson!"

We put you in total control

JOHNSON CONTROLS

Control Products Division
1250 E. Diehl Road, Naperville, IL 60540
[illegible] Warden Ave., Scarborough, Ontario M1L4C6

Available through Johnson Controls Wholesalers

Circle 33 on Reader Action Card

New Hampshire - New Jersey

Manchester, N.H.

Housing units	59,573
Central cooling	1%
Room units	32%

Home heating system

Warm air furnace	20%
Hydronic	49%
Heat pump	1%
Other/none	30%

Home heating fuel

Gas	19%
Fuel oil	60%
Electricity	12%
Bottled/tank/LP	1%
Other/none	8%

1970 - 1980 growth

Single family homes	13,784
Multifamily homes	10,036
Centrally cooled homes	993
Warm air furnaces	5,158
Hydronic systems	1,070

Atlantic City, N.J.

Housing units	87,601
Central cooling	15%
Room units	34%

Home heating system

Warm air furnace	31%
Hydronic	46%
Heat pump	2%
Other/none	21%

Home heating fuel

Gas	37%
Fuel oil	46%
Electricity	14%
Bottled/tank/LP	1%
Other/none	2%

1970 - 1980 growth

Single family homes	11,869
Multifamily homes	7,931
Centrally cooled homes	10,468
Warm air furnaces	10,398
Hydronic systems	1,532

Jersey City, N.J.

Housing units	221,211
Central cooling	7%
Room units	52%

Home heating system

Warm air furnace	11%
Hydronic	73%
Heat pump	1%
Other/none	15%

Home heating fuel

Gas	44%
Fuel oil	50%
Electricity	5%
Bottled/tank/LP	1%
Other/none	—

Age of heating system

18,595 single family detached

0-3 years	16%
4-10 years	10%
11-20 years	19%
21-40 years	24%
41+ years	31%

Newark, N.J.

Housing units	705,983
Central cooling	14%
Room units	48%

Home heating system

Warm air furnace	25%
Hydronic	64%
Heat pump	1%
Other/none	10%

Home heating fuel

Gas	42%
Fuel oil	52%
Electricity	4%
Bottled/tank/LP	1%
Other/none	1%

Age of heating system

345,702 single family detached

0-3 years	11%
4-10 years	16%
11-20 years	25%
21-40 years	28%
41+ years	20%

Paterson, N.J.

Housing units	158,124
Central cooling	9%
Room units	52%

Home heating system

Warm air furnace	17%
Hydronic	69%
Heat pump	—
Other/none	14%

Home heating fuel

Gas	55%
Fuel oil	40%
Electricity	4%
Bottled/tank/LP	—
Other/none	1%

Age of heating system

66,137 single family detached

0-3 years	10%
4-10 years	14%
11-20 years	25%
21-40 years	34%
41+ years	17%

Trenton, N.J.

Housing units	111,556
Central cooling	22%
Room units	45%

Home heating system

Warm air furnace	44%
Hydronic	45%
Heat pump	1%
Other/none	10%

Home heating fuel

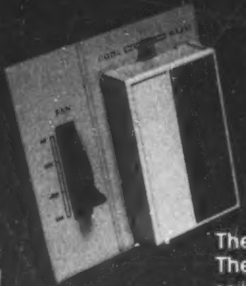
Gas	45%
Fuel oil	49%
Electricity	5%
Bottled/tank/LP	—
Other/none	1%

Age of heating system

53,236 single family detached

0-3 years	13%
4-10 years	19%
11-20 years	15%
21-40 years	34%
41+ years	19%

the commercial thermostats that last and last and last



The T28 Fan Coil Thermostat. This fan coil thermostat has the option of multiposition fan speed switch, thermometer, and uses a bimetal sensing element. Simple but nice.

You'd think that all line voltage thermostats designed for commercial applications would be made with metal covers wouldn't you? They aren't. And that's probably because so many are simply upgraded residential models. But if YOU were going to put a thermostat in a business office or a school or a factory or a hotel, you'd not only want it to control the temperature, but you'd also want it to be durable and safe. That's why Johnson Controls makes thermostats specifically for commercial use and makes them with all-metal enclosures. And it's also why the people who want to avoid call backs are going to say,

The T26 Field Convertible Thermostat. Converts to horizontal or vertical. With knob or concealed adjustment. With exposed or concealed thermometer. In Fahrenheit or Celsius. In short, it fits nicely to almost any application.

The T23 Fan Coil Thermostat. Select low, medium or high fan speed. Built-in options with choice of system switch selection. All line voltage wiring is behind the wall mounting plate. A nice safety feature.

We put you in total control

JOHNSON
CONTROLS

Control Products Division
1250 E. Diehl Road, Naperville, IL 60540
929 Warden Ave., Scarborough, Ontario M1L4C6

Available through Johnson Controls Wholesalers

Circle 34 on Reader Action Card

New Mexico - New York

Albuquerque, N.M.

Housing units	173,822
Central cooling	60%
Room units	16%

Home heating system

Warm air furnace	64%
Hydronic	2%
Heat pump	1%
Other/none	33%

Home heating fuel

Gas	86%
Fuel oil	—
Electricity	9%
Bottled/tank/LP	2%
Other/none	3%

Age of heating system
108,975 single family detached

0-3 years	21%
4-10 years	14%
11-20 years	33%
21-40 years	22%
41+ years	10%

Albany, N.Y.

Housing units	307,688
Central cooling	8%
Room units	29%

Home heating system

Warm air furnace	34%
Hydronic	53%
Heat pump	2%
Other/none	11%

Home heating fuel

Gas	47%
Fuel oil	39%
Electricity	9%
Bottled/tank/LP	1%
Other/none	4%

Age of heating system
164,119 single family detached

0-3 years	15%
4-10 years	22%
11-20 years	29%
21-40 years	17%
41+ years	17%

Binghamton, N.Y.

Housing units	113,322
Central cooling	3%
Room units	17%

Home heating system

Warm air furnace	54%
Hydronic	26%
Heat pump	1%
Other/none	19%

Home heating fuel

Gas	51%
Fuel oil	35%
Electricity	7%
Bottled/tank/LP	1%
Other/none	6%

Age of heating system
70,391 single family detached

0-3 years	9%
4-10 years	18%
11-20 years	29%
21-40 years	11%
41+ years	33%

Buffalo, N.Y.

Housing units	471,874
Central cooling	61%
Room units	16%

Home heating system

Warm air furnace	62%
Hydronic	23%
Heat pump	1%
Other/none	14%

Home heating fuel

Gas	84%
Fuel oil	10%
Electricity	5%
Bottled/tank/LP	—
Other/none	1%

Age of heating system
255,569 single family detached

0-3 years	11%
4-10 years	15%
11-20 years	32%
21-40 years	21%
41+ years	21%

New York, N.Y.

Housing units	3,670,386
Central cooling	8%
Room units	42%

Home heating system

Warm air furnace	12%
Hydronic	81%
Heat pump	—
Other/none	7%

Home heating fuel

Gas	34%
Fuel oil	60%
Electricity	3%
Bottled/tank/LP	—
Other/none	1%

Age of heating system
603,218 single family detached

0-3 years	7%
4-10 years	11%
11-20 years	31%
21-40 years	34%
41+ years	17%

Rochester, N.Y.

Housing units	359,470
Central cooling	9%
Room units	23%

Home heating system

Warm air furnace	62%
Hydronic	19%
Heat pump	1%
Other/none	18%

Home heating fuel

Gas	66%
Fuel oil	21%
Electricity	9%
Bottled/tank/LP	1%
Other/none	3%

Age of heating system
255,792 single family detached

0-3 years	6%
4-10 years	24%
11-20 years	32%
21-40 years	21%
41+ years	17%

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Don't judge an electronic air cleaner by its cover. Because it's what you *can't* see in the Honeywell Electronic Air Cleaner that makes all the difference.

HIDDEN EFFECTIVENESS

Inside is Honeywell's specially designed protective screen that effectively pre-filters lint and larger dust particles. So the air cleaner stays more efficient longer. And there's less pressure drop than in other electronic air cleaner protective screens that clog easily.

Behind that, is Honeywell's Super Cell—a rugged, highly efficient unit with more collector plates spaced closer together, to filter up to 95% of the dust (ASHRAE Std. 52-76), smoke, pollen, and other particles smaller than one micron. Customers like its easy removal and dishwasher cleanup.

And both the pre-screen and Super Cell are surrounded by a tough, corrosion-resistant galvanized cabinet.

HIDDEN TIMESAVERS

Honeywell quality works for you, too. Because you won't spend a lot of time on callbacks with a Honeywell Electronic Air Cleaner.

Our power supply is dependable, proven over time to deliver years of trouble-free service. And in the unlikely event that a problem does pop up, it's built for easy serviceability.

And, Honeywell's exclusive test button lets customers prove that their air cleaner is working properly. So you get fewer "false alarm" service calls.

HIDDEN PROFITS

Best of all, here's the inside story on profits. Today's customers want quality and will pay for it. They know a quality product is cheaper in the long run. And they know Honeywell has always meant quality. And value. And efficiency.

Why lose profits from a big ticket sale by specifying something else—or nothing at all? And why risk your company's quality image by installing anything less than a Honeywell?

Clean up by fighting dirty. With Honeywell. Ask your wholesaler or Honeywell representative about the contractor's Electronic Air Cleaner Demo. And turn Honeywell's inside story into a profit story for you.

Together, we can find the answers.

Honeywell

Circle 31 on Reader Action Card

New York - North Carolina

Syracuse, N.Y.

Housing units	237,444
Central cooling	7%
Room units	23%

Home heating system

Warm air furnace	62%
Hydronic	19%
Heat pump	1%
Other/none	18%

Home heating fuel

Gas	66%
Fuel oil	18%
Electricity	10%
Bottled/tank/LP	1%
Other/none	5%

Age of heating system

143,849 single family detached

0-3 years	11%
4-10 years	19%
11-20 years	31%
21-40 years	22%
41+ years	17%

Utica, N.Y.

Housing units	118,614
Central cooling	2%
Room units	20%

Home heating system

Warm air furnace	61%
Hydronic	20%
Heat pump	—
Other/none	19%

Home heating fuel

Gas	51%
Fuel oil	37%
Electricity	6%
Bottled/tank/LP	—
Other/none	6%

Age of heating system

68,647 single family detached

0-3 years	7%
4-10 years	12%
11-20 years	38%
21-40 years	27%
41+ years	16%

Asheville, N.C.

Housing units	71,802
Central cooling	7%
Room units	8%

Home heating system

Warm air furnace	49%
Hydronic	7%
Heat pump	3%
Other/none	41%

Home heating fuel

Gas	10%
Fuel oil	59%
Electricity	17%
Bottled/tank/LP	1%
Other/none	13%

1970 - 1980 growth

Single family homes	12,168
Multifamily homes	8,791
Centrally cooled homes	4,319
Warm air furnaces	8,287
Hydronic systems	—

Charlotte, N.C.

Housing units	238,893
Central cooling	41%
Room units	6%

Home heating system

Warm air furnace	51%
Hydronic	2%
Heat pump	10%
Other/none	37%

Home heating fuel

Gas	34%
Fuel oil	28%
Electricity	34%
Bottled/tank/LP	1%
Other/none	3%

Age of heating system

166,024 single family detached

0-3 years	14%
4-10 years	30%
11-20 years	22%
21-40 years	14%
41+ years	20%

Fayetteville, N.C.

Housing units	81,269
Central cooling	46%
Room units	32%

Home heating system

Warm air furnace	51%
Hydronic	1%
Heat pump	11%
Other/none	37%

Home heating fuel

Gas	18%
Fuel oil	32%
Electricity	41%
Bottled/tank/LP	8%
Other/none	1%

1970 - 1980 growth

Single family homes	16,337
Multifamily homes	8,111
Centrally cooled homes	26,900
Warm air furnaces	13,535
Hydronic systems	—

Greensboro, N.C.

Housing units	318,443
Central cooling	33%
Room units	32%

Home heating system

Warm air furnace	45%
Hydronic	5%
Heat pump	9%
Other/none	41%

Home heating fuel

Gas	20%
Fuel oil	40%
Electricity	32%
Bottled/tank/LP	1%
Other/none	7%

1970 - 1980 growth

Single family homes	90,779
Multifamily homes	42,825
Centrally cooled homes	86,904
Warm air furnaces	52,482
Hydronic systems	—

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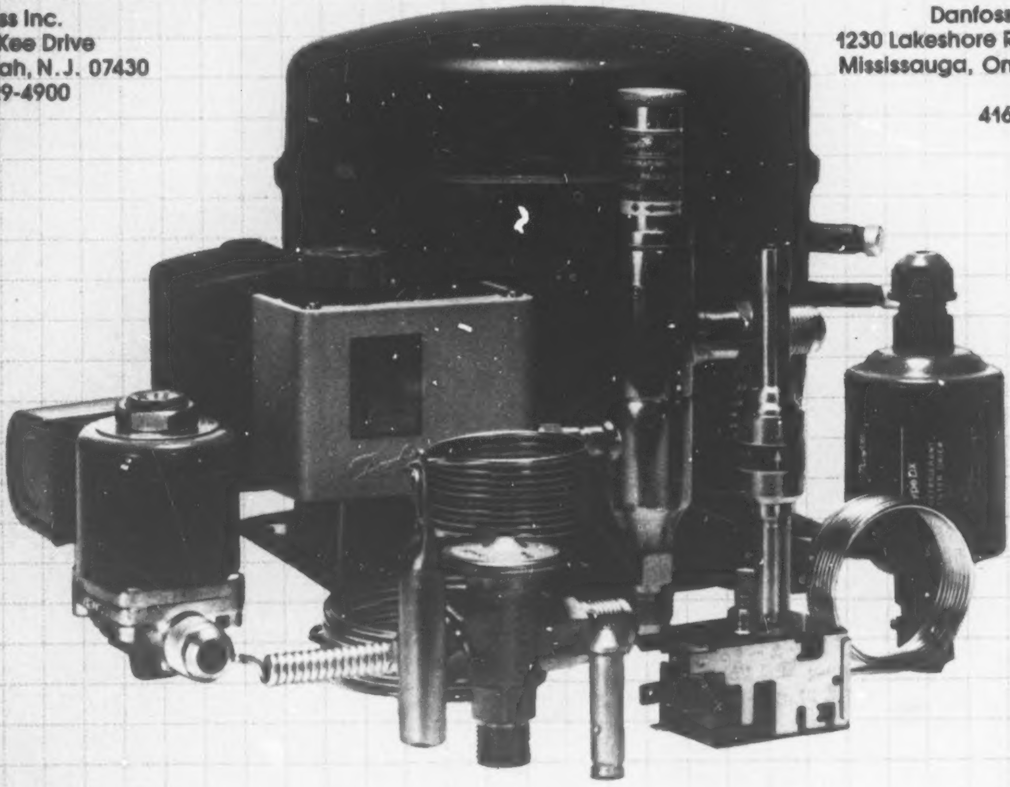
A compressor from this company. An expansion valve from that one. And lots of time lost while you phone around. Getting the refrigeration products you need when you need them can make you hot under the collar.

Now you can cool it. Danfoss — with 50 years of controls engineering leadership known all over the world for quality and reliability — is a complete source for *all* your refrigeration needs. Every product is manufactured with technical superiority and thoroughly tested for durable and dependable operation. And a worldwide distribution and service network makes sure you don't cool your heels waiting for what you need.

Get the complete story from the complete source: Danfoss Inc.

Danfoss Inc.
16 McKee Drive
Mahwah, N.J. 07430
201-529-4900

Danfoss Mfg. Ltd.
1230 Lakeshore Road East
Mississauga, Ont. L5E 1E9
Canada
416-274-2311



Circle 16 on Reader Action Card

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Circle 80 on Reader Action Card

Raleigh, N.C.

Housing units	200,273
Central cooling	51%
Room units	28%

Home heating system

Warm air furnace	52%
Hydronic	5%
Heat pump	11%
Other/none	32%

Home heating fuel

Gas	31%
Fuel oil	25%
Electricity	37%
Bottled/tank/LP	4%
Other/none	3%

1970 - 1980 growth

Single family homes	79,178
Multifamily homes	49,955
Centrally cooled homes	87,607
Warm air furnaces	69,334
Hydronic systems	2,506

Wilmington, N.C.

Housing units	59,118
Central cooling	42%
Room units	30%

Home heating system

Warm air furnace	36%
Hydronic	3%
Heat pump	17%
Other/none	44%

Home heating fuel

Gas	10%
Fuel oil	32%
Electricity	46%
Bottled/tank/LP	6%
Other/none	6%

1970 - 1980 growth

Single family homes	13,689
Multifamily homes	4,956
Centrally cooled homes	18,989
Warm air furnaces	8,450
Hydronic systems	—

Akron, Ohio

Housing units	247,140
Central cooling	17%
Room units	24%

Home heating system

Warm air furnace	80%
Hydronic	9%
Heat pump	1%
Other/none	10%

Home heating fuel

Gas	82%
Fuel oil	10%
Electricity	6%
Bottled/tank/LP	—
Other/none	2%

Age of heating system

174,000 single family detached

0-3 years	11%
4-10 years	18%
11-20 years	22%
21-40 years	29%
41+ years	20%

Canton, Ohio

Housing units	152,495
Central cooling	16%
Room units	20%

Home heating system

Warm air furnace	77%
Hydronic	7%
Heat pump	3%
Other/none	23%

Home heating fuel

Gas	75%
Fuel oil	11%
Electricity	11%
Bottled/tank/LP	—
Other/none	3%

Age of heating system

112,000 single family detached

0-3 years	8%
4-10 years	28%
11-20 years	24%
21-40 years	26%
41+ years	14%

Cincinnati, Ohio

Housing units	530,593
Central cooling	32%
Room units	32%

Home heating system

Warm air furnace	64%
Hydronic	17%
Heat pump	6%
Other/none	13%

Home heating fuel

Gas	69%
Fuel oil	12%
Electricity	15%
Bottled/tank/LP	2%
Other/none	2%

Age of heating system

311,000 single family detached

0-3 years	15%
4-10 years	24%
11-20 years	31%
21-40 years	15%
41+ years	15%

Cleveland, Ohio

Housing units	733,034
Central cooling	20%
Room units	27%

Home heating system

Warm air furnace	71%
Hydronic	17%
Heat pump	3%
Other/none	9%

Home heating fuel

Gas	86%
Fuel oil	5%
Electricity	7%
Bottled/tank/LP	—
Other/none	2%

Age of heating system

436,000 single family detached

0-3 years	12%
4-10 years	15%
11-20 years	33%
21-40 years	28%
41+ years	12%

Columbus, Ohio

Housing units	425,793
Central cooling	38%
Room units	20%

Home heating system

Warm air furnace	76%
Hydronic	5%
Heat pump	6%
Other/none	13%

Home heating fuel

Gas	76%
Fuel oil	7%
Electricity	14%
Bottled/tank/LP	1%
Other/none	2%

Age of heating system

259,000 single family detached

0-3 years	12%
4-10 years	24%
11-20 years	28%
21-40 years	13%
41+ years	23%

Dayton, Ohio

Housing units	319,999
Central cooling	41%
Room units	28%

Home heating system

Warm air furnace	70%
Hydronic	8%
Heat pump	6%
Other/none	16%

Home heating fuel

Gas	69%
Fuel oil	9%
Electricity	19%
Bottled/tank/LP	2%
Other/none	1%

Age of heating system

224,000 single family detached

0-3 years	12%
4-10 years	27%
11-20 years	28%
21-40 years	16%
41+ years	17%

Hamilton, Ohio

Housing units	92,434
Central cooling	40%
Room units	29%

Home heating system

Warm air furnace	71%
Hydronic	5%
Heat pump	9%
Other/none	15%

Home heating fuel

Gas	58%
Fuel oil	18%
Electricity	21%
Bottled/tank/LP	—
Other/none	3%

1970 - 1980 growth

Single family homes	14,291
Multifamily homes	9,885
Centrally cooled homes	30,075
Warm air furnaces	12,419
Hydronic systems	—

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A new look at an old idea that can cut cooling costs in half.

Calmac introduces LEVLOAD,™ the Ice Bank Stored Cooling System for commercial air conditioning.

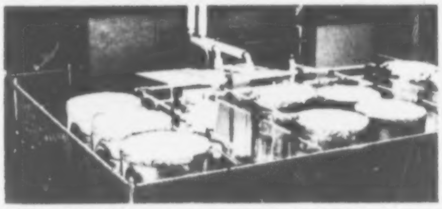
It can actually cut summer cooling costs in half — by cutting peak demand charges substantially — using either a load-shifting or load-leveling method.

The LEVLOAD system uses a standard packaged chiller to produce solid ice at night during off-peak energy periods. The ice is then used to help meet the building's cooling needs the next day.

What makes the LEVLOAD Ice Bank different.

The concept of making ice at night for use during the day is not new. It's been used for years in cooling short-peak applications.

The LEVLOAD system is ideal for longer peak use because of its patented spiral heat exchanger and plastic storage tank. This compact, factory made modular unit has operating features far superior to older direct expansion or water-storage systems.



Why the LEVLOAD system is better than other stored cooling systems.

It saves space by using the much more efficient ice medium for cool storage instead of water. And complete freeze-up of solid ice provides self-insulation and very low standby losses.

LEVLOAD is a closed brine system with low pumping power needs. No water treatment, filtration or system heat exchanger required. And the LEVLOAD's factory-built modules are fast and easy to install.

As in your home ice cube tray, flexible plastic is better suited to ice than metal is. That's why LEVLOAD's high density spiral heat exchanger can provide much more heat transfer surface than ice builders.

For more information on Calmac's remarkably efficient and economical LEVLOAD Ice Bank Stored Cooling System, write or call:

Calmac Manufacturing Corporation,
Box 710, 150 South Van Brunt St.,
Englewood, N.J. 07631.
201-569-0420/212-586-5178.

CALMAC

Ice Bank is an idea whose time has come. Again.

Circle 11 on Reader Action Card

Lima, Ohio

Housing units	79,483
Central cooling	18%
Room units	28%

Home heating system

Warm air furnace	56%
Hydronic	9%
Heat pump	4%
Other/none	31%

Home heating fuel

Gas	56%
Fuel oil	12%
Electricity	23%
Bottled/tank/LP	5%
Other/none	4%

1970 - 1980 growth

Single family homes	19,013
Multifamily homes	6,331
Centrally cooled homes	11,693
Warm air furnaces	12,513
Hydronic systems	2,134

Lorain, Ohio

Housing units	95,841
Central cooling	17%
Room units	27%

Home heating system

Warm air furnace	68%
Hydronic	14%
Heat pump	3%
Other/none	15%

Home heating fuel

Gas	78%
Fuel oil	5%
Electricity	12%
Bottled/tank/LP	1%
Other/none	4%

1970 - 1980 growth

Single family homes	13,145
Multifamily homes	6,889
Centrally cooled homes	12,838
Warm air furnaces	8,100
Hydronic systems	2,438

Springfield, Ohio

Housing units	68,822
Central cooling	19%
Room units	21%

Home heating system

Warm air furnace	72%
Hydronic	6%
Heat pump	1%
Other/none	21%

Home heating fuel

Gas	71%
Fuel oil	14%
Electricity	10%
Bottled/tank/LP	1%
Other/none	4%

1970 - 1980 growth

Single family homes	14,876
Multifamily homes	3,972
Centrally cooled homes	9,922
Warm air furnaces	13,005
Hydronic systems	—

Steubenville, Ohio

Housing units	61,704
Central cooling	20%
Room units	25%

Home heating system

Warm air furnace	74%
Hydronic	7%
Heat pump	3%
Other/none	16%

Home heating fuel

Gas	60%
Fuel oil	19%
Electricity	16%
Bottled/tank/LP	—
Other/none	5%

1970 - 1980 growth

Single family homes	4,887
Multifamily homes	3,748
Centrally cooled homes	9,103
Warm air furnaces	5,222
Hydronic systems	—

Toledo, Ohio

Housing units	296,409
Central cooling	18%
Room units	29%

Home heating system

Warm air furnace	66%
Hydronic	12%
Heat pump	3%
Other/none	19%

Home heating fuel

Gas	71%
Fuel oil	9%
Electricity	12%
Bottled/tank/LP	6%
Other/none	2%

Age of heating system

206,000 single family detached

0-3 years	15%
4-10 years	21%
11-20 years	20%
21-40 years	23%
41+ years	15%

Youngstown, Ohio

Housing units	196,376
Central cooling	12%
Room units	23%

Home heating system

Warm air furnace	77%
Hydronic	10%
Heat pump	1%
Other/none	12%

Home heating fuel

Gas	79%
Fuel oil	11%
Electricity	6%
Bottled/tank/LP	1%
Other/none	4%

1970 - 1980 growth

Single family homes	15,075
Multifamily homes	13,593
Centrally cooled homes	18,878
Warm air furnaces	17,298
Hydronic systems	5,093

Oklahoma City, Ok.

Housing units	341,495
Central cooling	58%
Room units	31%

Home heating system

Warm air furnace	61%
Hydronic	1%
Heat pump	2%
Other/none	36%

Home heating fuel

Gas	74%
Fuel oil	—
Electricity	21%
Bottled/tank/LP	4%
Other/none	1%

Age of heating system
244,000 single family detached

0-3 years	15%
4-10 years	22%
11-20 years	27%
21-40 years	23%
41+ years	13%

Tulsa, Ok.

Housing units	279,502
Central cooling	52%
Room units	33%

Home heating system

Warm air furnace	60%
Hydronic	—
Heat pump	2%
Other/none	38%

Home heating fuel

Gas	77%
Fuel oil	—
Electricity	14%
Bottled/tank/LP	6%
Other/none	3%

1970 - 1980 growth

Single family homes	70,908
Multifamily homes	36,942
Centrally cooled homes	104,552
Warm air furnaces	94,598
Hydronic systems	—

Eugene, Ore.

Housing units	110,545
Central cooling	5%
Room units	8%

Home heating system

Warm air furnace	21%
Hydronic	2%
Heat pump	4%
Other/none	71%

Home heating fuel

Gas	11%
Fuel oil	8%
Electricity	69%
Bottled/tank/LP	1%
Other/none	11%

1970 - 1980 growth

Single family homes	20,915
Multifamily homes	18,590
Centrally cooled homes	4,201
Warm air furnaces	9,644
Hydronic systems	—

Portland, Ore.

Housing units	504,152
Central cooling	7%
Room units	9%

Home heating system

Warm air furnace	46%
Hydronic	5%
Heat pump	4%
Other/none	45%

Home heating fuel

Gas	26%
Fuel oil	25%
Electricity	43%
Bottled/tank/LP	2%
Other/none	4%

Age of heating system
335,962 single family detached

0-3 years	9%
4-10 years	16%
11-20 years	23%
21-40 years	25%
41+ years	27%

Salem, Ore.

Housing units	96,889
Central cooling	8%
Room units	6%

Home heating system

Warm air furnace	45%
Hydronic	1%
Heat pump	6%
Other/none	48%

Home heating fuel

Gas	27%
Fuel oil	16%
Electricity	47%
Bottled/tank/LP	1%
Other/none	9%

1970 - 1980 growth

Single family homes	21,192
Multifamily homes	13,396
Centrally cooled homes	6,537
Warm air furnaces	16,235
Hydronic systems	—

Allentown, Pa.

Housing units	242,020
Central cooling	11%
Room units	40%

Home heating system

Warm air furnace	25%
Hydronic	49%
Heat pump	2%
Other/none	24%

Home heating fuel

Gas	20%
Fuel oil	54%
Electricity	19%
Bottled/tank/LP	1%
Other/none	6%

Age of heating system
126,563 single family detached

0-3 years	11%
4-10 years	19%
11-20 years	29%
21-40 years	18%
41+ years	23%

Erie, Pa.

Housing units	102,935
Central cooling	6%
Room units	13%

Home heating system

Warm air furnace	77%
Hydronic	12%
Heat pump	1%
Other/none	10%

Home heating fuel

Gas	86%
Fuel oil	6%
Electricity	5%
Bottled/tank/LP	1%
Other/none	2%

Age of heating system

67,555 single family detached

0-3 years	7%
4-10 years	26%
11-20 years	27%
21-40 years	19%
41+ years	21%

Harrisburg, Pa.

Housing units	174,458
Central cooling	17%
Room units	35%

Home heating system

Warm air furnace	38%
Hydronic	34%
Heat pump	3%
Other/none	25%

Home heating fuel

Gas	19%
Fuel oil	53%
Electricity	20%
Bottled/tank/LP	—
Other/none	8%

Age of heating system

96,984 single family detached

0-3 years	11%
4-10 years	23%
11-20 years	30%
21-40 years	15%
41+ years	21%

Johnstown, Pa.

Housing units	97,712
Central cooling	2%
Room units	8%

Home heating system

Warm air furnace	39%
Hydronic	45%
Heat pump	1%
Other/none	15%

Home heating fuel

Gas	38%
Fuel oil	37%
Electricity	10%
Bottled/tank/LP	1%
Other/none	14%

1970 - 1980 growth

Single family homes	10,018
Multifamily homes	3,819
Centrally cooled homes	1,203
Warm air furnaces	5,905
Hydronic systems	1,559

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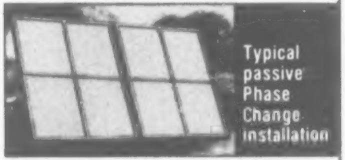

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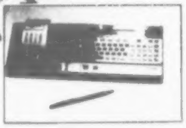

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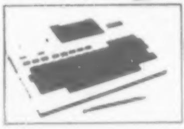

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The Method of the 80's

Circle 21 on Reader Action Card

Lancaster, Pa.

Housing units	129,046
Central cooling	16%
Room units	33%
Home heating system	
Warm air furnace	36%
Hydronic	35%
Heat pump	4%
Other/none	25%
Home heating fuel	
Gas	16%
Fuel oil	57%
Electricity	20%
Bottled/tank/LP	1%
Other/none	6%
Age of heating system **71,078 single family detached**	
0-3 years	7%
4-10 years	18%
11-20 years	24%
21-40 years	36%
41+ years	15%

Philadelphia, Pa.

Housing units	1,756,894
Central cooling	21%
Room units	43%
Home heating system	
Warm air furnace	43%
Hydronic	41%
Heat pump	2%
Other/none	14%
Home heating fuel	
Gas	56%
Fuel oil	28%
Electricity	9%
Bottled/tank/LP	2%
Other/none	5%
Age of heating system **653,303 single family detached**	
0-3 years	11%
4-10 years	16%
11-20 years	30%
21-40 years	24%
41+ years	19%

Pittsburgh, Pa.

Housing units	873,097
Central cooling	15%
Room units	21%
Home heating system	
Warm air furnace	71%
Hydronic	19%
Heat pump	1%
Other/none	9%
Home heating fuel	
Gas	83%
Fuel oil	8%
Electricity	6%
Bottled/tank/LP	—
Other/none	3%
Age of heating system **560,633 single family detached**	
0-3 years	11%
4-10 years	17%
11-20 years	28%
21-40 years	25%
41+ years	19%

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Circle 26 on Reader Action Card

Reading, Pa.

Housing units	119,553
Central cooling	12%
Room units	34%

Home heating system

Warm air furnace	36%
Hydronic	47%
Heat pump	2%
Other/none	15%

Home heating fuel

Gas	23%
Fuel oil	61%
Electricity	11%
Bottled/tank/LP	—
Other/none	5%

Age of heating system

57,341 single family detached

0-3 years	12%
4-10 years	23%
11-20 years	25%
21-40 years	23%
41+ years	17%

York, Pa.

Housing units	140,830
Central cooling	11%
Room units	32%

Home heating system

Warm air furnace	41%
Hydronic	34%
Heat pump	2%
Other/none	23%

Home heating fuel

Gas	43%
Fuel oil	40%
Electricity	12%
Bottled/tank/LP	1%
Other/none	4%

1970 - 1980 growth

Single family homes	19,774
Multifamily homes	12,497
Centrally cooled homes	10,942
Warm air furnaces	15,238
Hydronic systems	5,238

Providence, R.I.

Housing units	349,906
Central cooling	4%
Room units	30%

Home heating system

Warm air furnace	20%
Hydronic	59%
Heat pump	1%
Other/none	20%

Home heating fuel

Gas	33%
Fuel oil	57%
Electricity	7%
Bottled/tank/LP	1%
Other/none	2%

Age of heating system

184,384 single family detached

0-3 years	11%
4-10 years	14%
11-20 years	30%
21-40 years	27%
41+ years	18%

Charleston, S.C.

Housing units	150,618
Central cooling	50%
Room units	27%

Home heating system

Warm air furnace	46%
Hydronic	1%
Heat pump	12%
Other/none	41%

Home heating fuel

Gas	38%
Fuel oil	10%
Electricity	36%
Bottled/tank/LP	13%
Other/none	3%

Age of heating system

92,949 single family detached

0-3 years	11%
4-10 years	21%
11-20 years	18%
21-40 years	24%
41+ years	26%

Columbia, S.C.

Housing units	143,057
Central cooling	52%
Room units	29%

Home heating system

Warm air furnace	54%
Hydronic	1%
Heat pump	12%
Other/none	33%

Home heating fuel

Gas	45%
Fuel oil	13%
Electricity	32%
Bottled/tank/LP	6%
Other/none	4%

1970 - 1980 growth

Single family homes	27,742
Multifamily homes	21,367
Centrally cooled homes	56,465
Warm air furnaces	31,539
Hydronic systems	—

Greenville, S.C.

Housing units	210,736
Central cooling	33%
Room units	31%

Home heating system

Warm air furnace	44%
Hydronic	2%
Heat pump	10%
Other/none	44%

Home heating fuel

Gas	20%
Fuel oil	39%
Electricity	30%
Bottled/tank/LP	4%
Other/none	7%

1970 - 1980 growth

Single family homes	79,136
Multifamily homes	33,313
Centrally cooled homes	61,523
Warm air furnaces	49,486
Hydronic systems	1,109

Sioux Falls, S.D.

Housing units	42,636
Central cooling	41%
Room units	36%

Home heating system

Warm air furnace	76%
Hydronic	14%
Heat pump	2%
Other/none	8%

Home heating fuel

Gas	78%
Fuel oil	7%
Electricity	7%
Bottled/tank/LP	5%
Other/none	3%

1970 - 1980 growth

Single family homes	5,980
Multifamily homes	6,317
Centrally cooled homes	13,411
Warm air furnaces	7,137
Hydronic systems	3,523

Chattanooga, Tenn.

Housing units	160,683
Central cooling	34%
Room units	44%

Home heating system

Warm air furnace	28%
Hydronic	1%
Heat pump	11%
Other/none	60%

Home heating fuel

Gas	21%
Fuel oil	3%
Electricity	60%
Bottled/tank/LP	5%
Other/none	11%

Age of heating system
114,248 single family detached

0-3 years	9%
4-10 years	17%
11-20 years	31%
21-40 years	24%
41+ years	19%

Knoxville, Tenn.

Housing units	186,593
Central cooling	35%
Room units	39%

Home heating system

Warm air furnace	29%
Hydronic	3%
Heat pump	13%
Other/none	55%

Home heating fuel

Gas	17%
Fuel oil	9%
Electricity	63%
Bottled/tank/LP	2%
Other/none	9%

1970 - 1980 growth

Single family homes	88,351
Multifamily homes	32,354
Centrally cooled homes	58,052
Warm air furnaces	40,047
Hydronic systems	—

Memphis, Tenn.

Housing units	331,422
Central cooling	52%
Room units	36%

Home heating system

Warm air furnace	57%
Hydronic	4%
Heat pump	4%
Other/none	35%

Home heating fuel

Gas	70%
Fuel oil	—
Electricity	23%
Bottled/tank/LP	4%
Other/none	3%

1970 - 1980 growth

Single family homes	61,464
Multifamily homes	23,147
Centrally cooled homes	1[illegible]0,859
Warm air furnaces	[illegible]0,001
Hydronic systems	—

Nashville, Tenn.

Housing units	319,514
Central cooling	41%
Room units	46%

Home heating system

Warm air furnace	36%
Hydronic	1%
Heat pump	8%
Other/none	55%

Home heating fuel

Gas	26%
Fuel oil	—
Electricity	61%
Bottled/tank/LP	4%
Other/none	9%

Age of heating system
211,150 single family detached

0-3 years	11%
4-10 years	15%
11-20 years	31%
21-40 years	22%
41+ years	21%

Amarillo, Texas

Housing units	69,519
Central cooling	42%
Room units	41%

Home heating system

Warm air furnace	56%
Hydronic	—
Heat pump	1%
Other/none	43%

Home heating fuel

Gas	89%
Fuel oil	—
Electricity	9%
Bottled/tank/LP	1%
Other/none	1%

1970 - 1980 growth

Single family homes	7,912
Multifamily homes	7,672
Centrally cooled homes	19,279
Warm air furnaces	16,697
Hydronic systems	—

Austin, Texas

Housing units	215,877
Central cooling	67%
Room units	20%

Home heating system

Warm air furnace	65%
Hydronic	1%
Heat pump	4%
Other/none	30%

Home heating fuel

Gas	62%
Fuel oil	—
Electricity	29%
Bottled/tank/LP	7%
Other/none	2%

Age of heating system

126,877 single family detached

0-3 years	14%
4-10 years	22%
11-20 years	19%
21-40 years	22%
41+ years	23%

Beaumont, Texas

Housing units	143,563
Central cooling	51%
Room units	36%

Home heating system

Warm air furnace	50%
Hydronic	1%
Heat pump	6%
Other/none	43%

Home heating fuel

Gas	66%
Fuel oil	—
Electricity	27%
Bottled/tank/LP	6%
Other/none	1%

1970 - 1980 growth

Single family homes	24,110
Multifamily homes	15,144
Centrally cooled homes	47,371
Warm air furnaces	33,185
Hydronic systems	1,143

Brownsville, Texas

Housing units	64,160
Central cooling	31%
Room units	25%

Home heating system

Warm air furnace	28%
Hydronic	5%
Heat pump	3%
Other/none	64%

Home heating fuel

Gas	50%
Fuel oil	—
Electricity	29%
Bottled/tank/LP	17%
Other/none	4%

1970 - 1980 growth

Single family homes	9,198
Multifamily homes	14,329
Centrally cooled homes	15,772
Warm air furnaces	13,902
Hydronic systems	2,543

Corpus Christi, Texas

Housing units	113,039
Central cooling	43%
Room units	28%

Home heating system

Warm air furnace	46%
Hydronic	2%
Heat pump	2%
Other/none	50%

Home heating fuel

Gas	68%
Fuel oil	—
Electricity	26%
Bottled/tank/LP	4%
Other/none	2%

1970 - 1980 growth

Single family homes	7,268
Multifamily homes	16,889
Centrally cooled homes	29,226
Warm air furnaces	25,398
Hydronic systems	1,559

Dallas, Texas

Housing units	1,169,659
Central cooling	67%
Room units	25%

Home heating system

Warm air furnace	67%
Hydronic	1%
Heat pump	3%
Other/none	29%

Home heating fuel

Gas	63%
Fuel oil	—
Electricity	31%
Bottled/tank/LP	5%
Other/none	1%

Age of heating system

759,777 single family detached

0-3 years	12%
4-10 years	23%
11-20 years	24%
21-40 years	21%
41+ years	20%

El Paso, Texas

Housing units	147,771
Central cooling	74%
Room units	15%

Home heating system

Warm air furnace	67%
Hydronic	3%
Heat pump	1%
Other/none	29%

Home heating fuel

Gas	86%
Fuel oil	—
Electricity	11%
Bottled/tank/LP	1%
Other/none	2%

1970 - 1980 growth

Single family homes	27,650
Multifamily homes	18,945
Centrally cooled homes	59,744
Warm air furnaces	49,953
Hydronic systems	—

Galveston, Texas

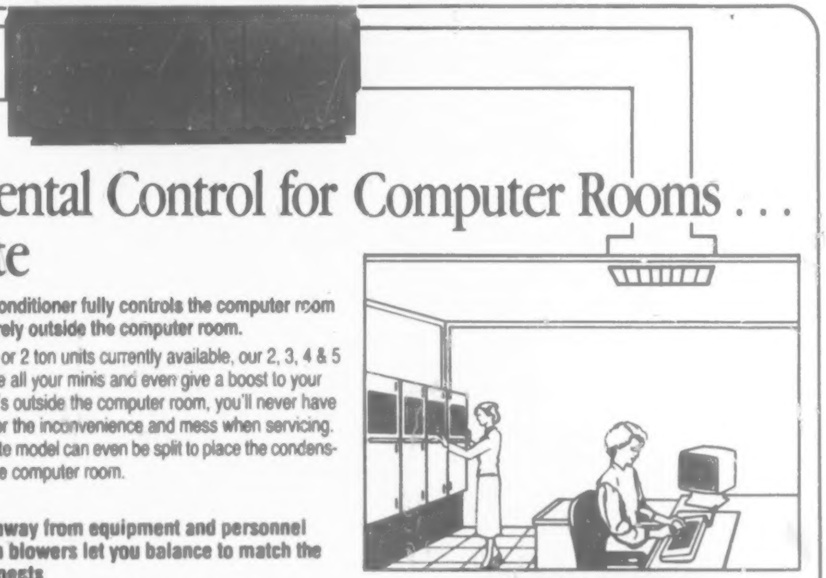
Housing units	77,415
Central cooling	49%
Room units	35%
Home heating system	
Warm air furnace	52%
Hydronic	1%
Heat pump	2%
Other/none	45%
Home heating fuel	
Gas	70%
Fuel oil	—
Electricity	26%
Bottled/tank/LP	4%
Other/none	—
1970 - 1980 growth	
Single family homes	6,948
Multifamily homes	8,720
Centrally cooled homes	23,083
Warm air furnaces	19,638
Hydronic systems	—

Houston, Texas

Housing units	1,160,385
Central cooling	69%
Room units	22%
Home heating system	
Warm air furnace	68%
Hydronic	1%
Heat pump	3%
Other/none	28%
Home heating fuel	
Gas	60%
Fuel oil	—
Electricity	35%
Bottled/tank/LP	4%
Other/none	1%
Age of heating system **675,700 single family detached**	
0-3 years	14%
4-10 years	22%
11-20 years	18%
21-40 years	20%
41+ years	26%

Lubbock, Texas

Housing units	80,326
Central cooling	55%
Room units	31%
Home heating system	
Warm air furnace	60%
Hydronic	—
Heat pump	2%
Other/none	38%
Home heating fuel	
Gas	78%
Fuel oil	—
Electricity	19%
Bottled/tank/LP	3%
Other/none	—
1970 - 1980 growth	
Single family homes	8,348
Multifamily homes	2,510
Centrally cooled homes	26,355
Warm air furnaces	2,419
Hydronic systems	—



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McAllen, Texas

Housing units	84,497
Central cooling	30%
Room units	24%

Home heating system

Warm air furnace	30%
Hydronic	2%
Heat pump	2%
Other/none	66%

Home heating fuel

Gas	49%
Fuel oil	—
Electricity	28%
Bottled/tank/LP	17%
Other/none	6%

1970 - 1980 growth

Single family homes	15,096
Multifamily homes	20,608
Centrally cooled homes	20,658
Warm air furnaces	20,358
Hydronic systems	1,955

San Antonio, Texas

Housing units	377,076
Central cooling	48%
Room units	29%

Home heating system

Warm air furnace	51%
Hydronic	2%
Heat pump	2%
Other/none	45%

Home heating fuel

Gas	75%
Fuel oil	—
Electricity	18%
Bottled/tank/LP	5%
Other/none	2%

Age of heating system

260,399 single family detached

0-3 years	10%
4-10 years	13%
11-20 years	25%
21-40 years	19%
41+ years	33%

Waco, Texas

Housing units	65,824
Central cooling	48%
Room units	35%

Home heating system

Warm air furnace	49%
Hydronic	1%
Heat pump	1%
Other/none	49%

Home heating fuel

Gas	67%
Fuel oil	—
Electricity	23%
Bottled/tank/LP	8%
Other/none	2%

1970 - 1980 growth

Single family homes	6,186
Multifamily homes	7,110
Centrally cooled homes	18,372
Warm air furnaces	14,729
Hydronic systems	—

Provo, Utah

Housing units	62,263
Central cooling	27%
Room units	19%

Home heating system

Warm air furnace	82%
Hydronic	3%
Heat pump	2%
Other/none	13%

Home heating fuel

Gas	90%
Fuel oil	—
Electricity	8%
Bottled/tank/LP	—
Other/none	2%

1970 - 1980 growth

Single family homes	16,232
Multifamily homes	10,454
Centrally cooled homes	13,844
Warm air furnaces	22,340
Hydronic systems	1,019

Salt Lake City, Utah

Housing units	314,598
Central cooling	36%
Room units	19%

Home heating system

Warm air furnace	84%
Hydronic	5%
Heat pump	1%
Other/none	10%

Home heating fuel

Gas	91%
Fuel oil	—
Electricity	7%
Bottled/tank/LP	—
Other/none	2%

Age of heating system

212,750 single family detached

0-3 years	15%
4-10 years	31%
11-20 years	20%
21-40 years	18%
41+ years	16%

Lynchburg, Va.

Housing units	55,635
Central cooling	29%
Room units	30%

Home heating system

Warm air furnace	42%
Hydronic	11%
Heat pump	5%
Other/none	—

Home heating fuel

Gas	13%
Fuel oil	15%
Electricity	33%
Bottled/tank/LP	2%
Other/none	37%

1970 - 1980 growth

Single family homes	11,240
Multifamily homes	5,420
Centrally cooled homes	12,193
Warm air furnaces	8,637
Hydronic systems	—

Newport News, Va.

Housing units	132,335
Central cooling	51%
Room units	30%

Home heating system

Warm air furnace	49%
Hydronic	11%
Heat pump	8%
Other/none	32%

Home heating fuel

Gas	36%
Fuel oil	30%
Electricity	27%
Bottled/tank/LP	2%
Other/none	5%

1970 - 1980 growth

Single family homes	27,196
Multifamily homes	17,783
Centrally cooled homes	45,945
Warm air furnaces	27,464
Hydronic systems	1,389

Norfolk, Va.

Housing units	284,290
Central cooling	44%
Room units	33%

Home heating system

Warm air furnace	39%
Hydronic	15%
Heat pump	10%
Other/none	36%

Home heating fuel

Gas	35%
Fuel oil	29%
Electricity	32%
Bottled/tank/LP	2%
Other/none	2%

1970 - 1980 growth

Single family homes	58,017
Multifamily homes	26,188
Centrally cooled homes	92,671
Warm air furnaces	41,696
Hydronic systems	—

Richmond, Va.

Housing units	241,123
Central cooling	40%
Room units	34%

Home heating system

Warm air furnace	39%
Hydronic	21%
Heat pump	9%
Other/none	31%

Home heating fuel

Gas	29%
Fuel oil	39%
Electricity	26%
Bottled/tank/LP	1%
Other/none	5%

Age of heating system

153,175 single family detached

0-3 years	14%
4-10 years	26%
11-20 years	25%
21-40 years	20%
41+ years	15%

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Roanoke, Va.

Housing units	88,603
Central cooling	32%
Room units	29%

Home heating system

Warm air furnace	48%
Hydronic	16%
Heat pump	6%
Other/none	30%

Home heating fuel

Gas	38%
Fuel oil	30%
Electricity	24%
Bottled/tank/LP	—
Other/none	8%

1970 - 1980 growth

Single family homes	17,596
Multifamily homes	9,280
Centrally cooled homes	22,518
Warm air furnaces	10,628
Hydronic systems	—

Seattle, Wash.

Housing units	653,320
Central cooling	2%
Room units	2%

Home heating system

Warm air furnace	47%
Hydronic	7%
Heat pump	3%
Other/none	53%

Home heating fuel

Gas	28%
Fuel oil	22%
Electricity	46%
Bottled/tank/LP	—
Other/none	4%

Age of heating system

426,700 single family detached

0-3 years	17%
4-10 years	18%
11-20 years	27%
21-40 years	22%
41+ years	16%

Spokane, Wash.

Housing units	137,384
Central cooling	12%
Room units	18%

Home heating system

Warm air furnace	51%
Hydronic	7%
Heat pump	4%
Other/none	38%

Home heating fuel

Gas	34%
Fuel oil	20%
Electricity	40%
Bottled/tank/LP	—
Other/none	6%

1970 - 1980 growth

Single family homes	20,831
Multifamily homes	17,320
Centrally cooled homes	11,758
Warm air furnaces	9,098
Hydronic systems	—

Tacoma, Wash.

Housing units	185,159
Central cooling	2%
Room units	2%

Home heating system

Warm air furnace	43%
Hydronic	4%
Heat pump	4%
Other/none	49%

Home heating fuel

Gas	24%
Fuel oil	19%
Electricity	53%
Bottled/tank/LP	—
Other/none	4%

1970 - 1980 growth

Single family homes	26,855
Multifamily homes	25,168
Centrally cooled homes	2,016
Warm air furnaces	22,054
Hydronic systems	—

Charleston, W. Va.

Housing units	104,458
Central cooling	29%
Room units	36%

Home heating system

Warm air furnace	50%
Hydronic	4%
Heat pump	5%
Other/none	41%

Home heating fuel

Gas	77%
Fuel oil	—
Electricity	19%
Bottled/tank/LP	1%
Other/none	3%

1970 - 1980 growth

Single family homes	15,253
Multifamily homes	14,414
Centrally cooled homes	24,501
Warm air furnaces	21,516
Hydronic systems	1,578

Huntington, W. Va.

Housing units	118,804
Central cooling	26%
Room units	39%

Home heating system

Warm air furnace	42%
Hydronic	2%
Heat pump	6%
Other/none	50%

Home heating fuel

Gas	67%
Fuel oil	2%
Electricity	21%
Bottled/tank/LP	5%
Other/none	5%

1970 - 1980 growth

Single family homes	19,706
Multifamily homes	11,943
Centrally cooled homes	24,386
Warm air furnaces	21,381
Hydronic systems	--

West Virginia - Wisconsin

Wheeling, W. Va.

Housing units	71,728
Central cooling	11%
Room units	27%

Home heating system

Warm air furnace	63%
Hydronic	6%
Heat pump	3%
Other/none	28%

Home heating fuel

Gas	66%
Fuel oil	12%
Electricity	18%
Bottled/tank/LP	1%
Other/none	3%

1970 - 1980 growth

Single family homes	5,800
Multifamily homes	3,468
Centrally cooled homes	6,492
Warm air furnaces	6,880
Hydronic systems	—

Appleton, Wis.

Housing units	102,454
Central cooling	11%
Room units	27%

Home heating system

Warm air furnace	71%
Hydronic	15%
Heat pump	1%
Other/none	13%

Home heating fuel

Gas	61%
Fuel oil	27%
Electricity	6%
Bottled/tank/LP	4%
Other/none	2%

1970 - 1980 growth

Single family homes	14,489
Multifamily homes	7,430
Centrally cooled homes	8,415
Warm air furnaces	14,228
Hydronic systems	2,937

Green Bay, Wis.

Housing units	62,008
Central cooling	8%
Room units	27%

Home heating system

Warm air furnace	66%
Hydronic	21%
Heat pump	2%
Other/none	11%

Home heating fuel

Gas	78%
Fuel oil	14%
Electricity	5%
Bottled/tank/LP	1%
Other/none	2%

1970 - 1980 growth

Single family homes	10,456
Multifamily homes	6,789
Centrally cooled homes	4,363
Warm air furnaces	10,769
Hydronic systems	4,555

Madison, Wis.

Housing units	125,611
Central cooling	19%
Room units	34%

Home heating system

Warm air furnace	66%
Hydronic	24%
Heat pump	2%
Other/none	8%

Home heating fuel

Gas	66%
Fuel oil	19%
Electricity	8%
Bottled/tank/LP	5%
Other/none	2%

Age of heating system

69,369 single family detached

0-3 years	10%
4-10 years	19%
11-20 years	25%
21-40 years	27%
41+ years	19%

Milwaukee, Wis.

Housing units	519,353
Central cooling	17%
Room units	31%

Home heating system

Warm air furnace	69%
Hydronic	20%
Heat pump	1%
Other/none	10%

Home heating fuel

Gas	76%
Fuel oil	18%
Electricity	5%
Bottled/tank/LP	1%
Other/none	—

Age of heating system

291,353 single family detached

0-3 years	15%
4-10 years	19%
11-20 years	30%
21-40 years	27%
41+ years	9%

Selected cities where heat pump saturation exceeds 10%

Boise, Idaho
Charleston, S.C.
Charlotte, N.C.
Chattanooga, Tenn.
Fort Lauderdale, Fla.
Jacksonville, Fla.
Knoxville, Tenn.
Las Vegas, Nev.
Miami, Fla.
Norfolk, Va.
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Raleigh, N.C.
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FROM PAGE 37

in home building affected gas furnace shipments, we should remember that, in 1979, the industry shipped 1,862,600 gas furnaces.

GAMA members last November forecast a 9.9% increase in gas furnace shipments for 1984 but based it on an estimated base that was 200,000 units lower than the final count for 1983. We think they're close to being right even so, partially because of the continued strong housing market and partially because the record cold in the first part of last winter probably changed many minds in favor of replacement for the sake of efficiency. That would bring the 1984 projection to 1,825,000 units.

Gas-fired unit heater shipments declined again in 1983, this time by 3.6% to 122,020 units, from a 1982 total of 126,600 units. The rebound in industrial construction should produce at least a 10% increase this year to 134,000 units.

It should be noted, too that the Bureau of the Census reported 1982 gas-fired unit heater shipments of 187,287 units, down 6.9% from the 201,094 units shipped in 1981. They are the latest figures available from that source, which obviously includes manufacturers who do not participate in the GAMA program.

Gas-fired duct furnace shipments dropped by 1.7% in 1983 to 16,912 units from a 1982 total of 17,200 units. Look for this product group to hold steady in 1984.

Gas-fired residential wall furnace shipments increased by 26.9% last year to 168,310 units. The comparable 1982 total was 132,640 units. The latest Bureau of the Census figures, which also include commercial and industrial wall furnaces, show a total of 230,583 gas wall furnaces shipped in 1982, up 2.7% from the 224,502 units shipped in 1981.

Each Statistical Panorama includes the latest data available. Sources frequently revise their previous year's figures, which explains apparent discrepancies between the latest and earlier published data. Where sources give significantly varying information, that data is mentioned.

Shipments of **recreational vehicle heating systems** climbed steeply last year. GAMA reported shipments of 176,103 units in 1983, up 61% from the 109,350 units shipped in 1982. This market should increase by another 20% this year to 210,000 units.

Although it is treated more completely in "Comfort in construction," we should point out here that the volatility of fuel prices that has been a characteristic of the past five years appears to be settling down to a point where marketers can look toward much more stability in the forseeable future.

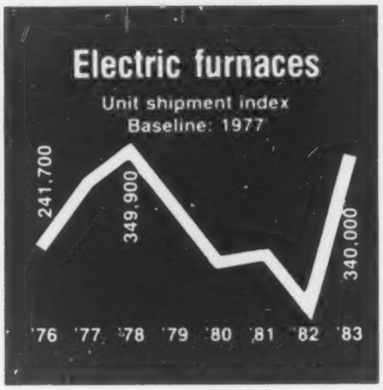
When the second major escalation in world oil prices impacted the U.S. in 1978, along with the sudden availability of natural gas after a decade of curtailments, there was a wave of conversions to natural gas from oil and from electricity dependent on oil for generation. The decontrol of oil prices in 1981 also helped.

The wave of conversions subsided in the early 1980's before a rising tide of natural gas price increases, which often ranged from 20% to 50% a year, in the wake of increases in the controlled price of interstate natural gas. Too, there was much debate about decontrolling the price of natural gas before the scheduled date of July, 1985.

Early last year, however, the price of natural gas edged past the price of residual fuel oil on a Btu-equivalent basis in many sections of the country. Major industrial users, who almost always can fire boilers with at least two fuels, began to switch from natural gas to heavy oil. For the natural gas industry, which sells about 60% of its gas to this class of user, the price ceiling had been reached in the industrial market.

As we pointed out in last year's "Statistical Panorama," it would be unwise to carry forward the steep escalations in residential and commercial natural gas prices much beyond applications now before public utility commissions for the simple reason that, over a two-year period, those price increases are likely to flatten out dramatically.

It is for this reason, too, that we do not expect the decontrol of natural gas prices next year to have any major effect on the market. The impact of take-or-buy contracts on utilities, many of which now are being renegotiated, probably already has accounted for most of the increases we could have expected next year. Gas supplies, too, would appear to be more than adequate for the near term.



Not considered in this scenario, either, is the impact of the public's move to high-efficiency and ultrahigh-efficiency furnaces and boilers. This phenomenon, which has created a whole new market, is only in its second year. It is already accounting for 15% to 20% of furnace and boiler sales. It consists primarily of thousands of homeowners who have elected to replace sound heating equipment with new units offering much higher efficiency.

Electric furnace shipments, which declined sharply during the housing recession, rebounded dramatically in 1983 with a 92% increase. The total last year was 339,950 units. Shipments in 1982 totaled only

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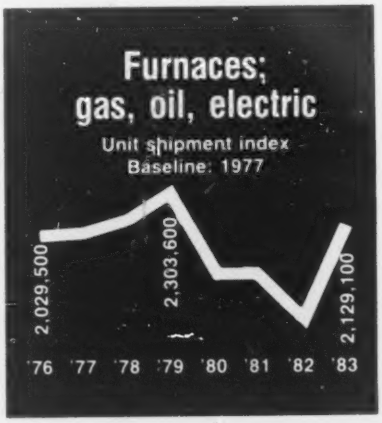

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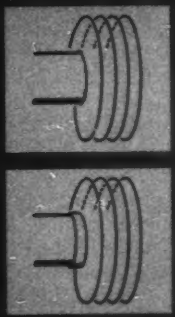

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177,100 units.

The electric furnace primary role as a back-up heat source for air-to-air heat pumps and as a sole heat source for some homes in the South should produce a 5% increase this year to 357,000. GAMA's members, however, are looking for a 1.4% increase.

The Bureau of the Census reported that, in 1982, the latest year for which these figures are available, 251,429 electric furnaces were shipped. This total is 15.3% less than the revised 1981 figures of 296,735 units.

Total **gas, oil, and electric furnace** furnace shipments in 1983 amounted to 2,129,100 units, up 48.2% from the previous year's total of 1,436,200 units.

Although another increase of this magnitude is highly unlikely, we feel the continued strength of the new home market, a steady replacement market, and a growing tendency to replace sound furnaces and boilers for reasons of efficiency will produce a 9.5% increase in 1984. That would bring the total to 2,331,300 units.

In addition to the furnaces already reported, the Bureau of the Census reported there were 4,776 **gravity warm air furnaces** shipped in 1982, the latest year for which figures are available. That represents a decline of 23.4% from the 1981 total of 6,239 units. **Forced air furnaces fired by solid fuels** (coal, coke, and wood) shipped in 1982 totaled 6,526 units, down 22.8% from the 8,457 solid-fuel furnaces shipped the previous year.

Similarly, the Census Bureau reported shipments of **electric unit heaters** in 1982 totaled 56,419 units, almost the same as the 56,897 units shipped in 1981. **Electric infrared heater** shipments, at 32,386 units in 1982, were up 10.6% over the 29,265 units shipped in the previous year.

Shipments of **electric duct furnaces,** at 34,349 units in 1982, were up 25.9% over the 27,277 units shipped in 1981. Strangely, electric duct heaters and electric boilers were grouped together. The total for 1982 was 32,679 units, down 12.3% from the 1981 total of 37,281 units. Prior information showed 25,524 duct furnaces were shipped in 1981.

Oil-burner installations in 1983 totaled 504,236 units, down 13% from the 580,000 units shipped in the previous year, according to Fuel Oil/Oil Heat and Solar Systems magazine.

Of these, 36,625 units were installed in new single-family homes last year, up 54% from the revised total of 23,894 oil-fired systems installed in new homes in 1982. New home installations totaled 85,000 in 1979.

Part of the reason for oil's slower recovery in the new home market is that new home construction in the Northeast, oil's stronghold, accounted for only 11.5% of the nation's new-home completions last year. Nationally, oil captured 2.2% of the new single-family home market (16.2% in the Northeast), down from 2.7% the previous year, and 0.9% of the multifamily home market in 1983 (12.5% in the Northeast), down from 5% in 1982.

There were 461,291 **replacement oil burners** shipped in 1983, a drop of 5% from the revised figure of 485,345 units shipped in 1982. The magazine estimated that more than 80% of these were retention-head or other high-efficiency burners which were used to replace less efficient burners on a voluntary (simply to save fuel) or involuntary (breakdown) basis.

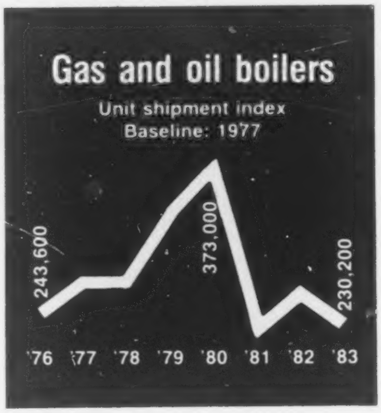
Conversions to oil from other fuels declined about 25% last year from 12,492 conversions in 1982 to 9,320 conversions in 1983. The rate of conversions from oil to gas, which approached 300,000 in 1980, declined sharply in the face of higher gas prices and declining oil prices and, today, are not considered a significant market factor.

The Bureau of the Census reports that 34,443 **commercial and industrial oil burner units** were shipped in 1982, the latest year for which figures are available, down 10.7% from the 38.600 units shipped in the previous year.

Replacement oil burner shipments for commercial and industrial applications in 1982 totaled 29,250 units, down 12% from the 33,219 units shipped a year earlier. In both cases, shipments were about equally divided among low- and high-pressure atomizing types.

The Census Bureau also reported 2,949 **oil-fired floor and wall furnaces** were shipped in 1982, down 19% from the 3,653 units shipped in 1981.

Although the outlook for **commercial-industrial boilers** is brightening, that industry still is experiencing a depressed level of boiler orders that represents only about 20% of industry capacity. Even that record is better than that of the utility or power boiler market, which for two years in a row has had no orders for the U.S. market.



The American Boiler Manufacturers Association (ABMA) reported that its members expect to ship power boilers with a total capacity of 2,060 MW to U.S. customers in 1984, up from zero last year. Power boilers for export, which totaled 1,500 MW in 1983, are expected to increase by 30% this year to 1,950 MW.

Industrial boiler orders totaled 15.6 million pounds of steam per hour in 1983, up 2.6% from the 15.16 million pounds of steam per hour shipped in 1982, or about 20% less than forecast. ABMA has forecast a 24% improvement for 1984 to 19.3 million pounds of steam per hour but, even with that improvement, production still would be 30% below historic averages.

The prospects for commercial fire tube boilers is a bit brighter. ABMA forecast that the unstated increase in 1983 shipments will continue through 1984, when totals will show 513,000 hp and 7,230 million Btu.

Because of changes in ABMA's reporting format, The News cannot report 1983 unit shipments for commercial and industrial boilers or for burners of more than 400,000 Btuh. The six-year slide in boiler shipments is due in part to energy conservation in industrial facilities, to recession economies in many of those years, and to uncertainties about government regulations.

TURN TO PAGE 102

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PHOTO: FROM LEFT TO RIGHT
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Paul H. Mitchell [illegible]

William Stamm [illegible]

Lawrence F. Ichniowski [illegible]

Joe Pehr [illegible]

FROM PAGE 100

Other heating equipment

In order to provide some perspective on the total comfort space heating scene, we might point out that, in 1982, the latest year for which figures are available, the Bureau of the Census reported shipments of 974,592 domestic heating stoves, down 18.5% from the 1,162,774 stoves shipped in the preceding year. Of these:

- 132,770 were gas-fired, down 38.7% from the 216,617 gas-fired heating stoves shipped in 1981. The shipment figures for 1981 also revealed that 99,847 units, or 46%, were vented circulating-type stoves.
- 254,650 were fired by coal, kerosene, gasoline, or fuel oil, up 88.7% from the 134,924 stoves of this type shipped in 1981.
- 587,172 were wood-fired stoves, down 27.6% from the 811,233 wood-fired stoves shipped in 1981. Of the wood stoves shipped in 1982, a total of 113,362 units (56%) were circulating types, 54,219 units (27%) were radiant types, and 34,677 (17%) were other types.
- 83,866 were wood-fired heat exchangers or zero-clearance fireplaces, down 18.8% from the 103,281 units of this type shipped in 1981.
- 158,944 were fireplace inserts, down 33.3% from the 223,348 inserts shipped in 1981.

Of the other nonelectric space-heating equipment shipped:

- 23,261 were gas-fired floor furnaces, up 3.2% from the 22,535 units shipped in 1981.
- 230,583 were panel-type gas-fired wall furnaces, up 2.7% from the 224,502 units shipped in the previous year.
- 2,949 were oil-fired floor and wall furnaces, down 19.3% from the 3,653 oil floor and wall furnaces shipped in 1981.
- 187,297 were gas-fired unit heaters of 400,000 Btuh and under, down 6.9% from the 201,094 gas unit heaters shipped in 1981. Of those shipped in 1982, about 64% (119,296 units) were high-static pressure units.

Wood-fired equipment

Surveys conducted for the Wood Heating Alliance by Housing Industry Dynamics projected that, in 1982, a total of 1,811,400 wood- or coal-burning stoves were installed in new or existing homes in the U.S., down 15.5% from the estimated 2,445,000 stoves installed in 1981. In both years, all but 20,000 stoves were installed in existing homes.

WHA also reported that 1,119,800 fireplaces were installed in U.S. homes in 1982, down 18.8% from the 1,380,000 fireplaces installed in 1981. Of those installed in 1982, new construction accounted for 612,600, or 54.7%, and repair-remodeling of existing homes accounted for 507,200, or 45.3%. For comparison, 46% went into new homes in 1981 and 54% went into existing homes.

Consumers also purchased 830,740 fireplace inserts in 1982, down 1% from the 838,760 fireplace inserts purchased in 1981. They purchased 210,650 wood- or coal-burning furnaces in 1982, of which 185,410, or 88%, were fired by wood and 24,240, or 12%, were fired by coal.

Of the stoves purchased in 1982, wood was the intended fuel for 1,100,110, or 61.4%. Another 2%, or 37,200 units, were coal-fired and 657,110 units, or 36.6%, could burn coal or wood. These ratios generally mirror the 1981 experience.

In all, 1,037,050 stoves, or 58%, were connected to masonry chimneys. Another 251,290 stoves, or 14%, used air-insulated prefabricated chimneys and 87,740 stoves, or 5%, used solid-pack prefabricated chimneys. Another 23% of those surveyed didn't know.

Looking at the stoves, 522,760, or 29%, were circulating cabinet types, 1,091,220, or 61%, were steel or cast-iron radiant types, 106,500, or 6%, were furnace add-ons, and 70,940 stoves were other types. Of the fireplaces, 631,340, or 76%, were masonry and 48,840, or 6%, were zero-clearance types. The other 18% didn't know.

More than four of five of the stoves were installed by the purchaser. The other 18% was split evenly between those purchased through an installer and those purchased by a consumer but installed by a contractor.

The average cost for a consumer-installed stove ranged from $430 to $798, with the more expensive installations in the Middle Atlantic, East North Central, and West regions. Average costs for contractor-installed stoves ranged from $650 to $1,700. The national average for a consumer-installed stove was $579 and, for a contractor-installed stove, $969. Both averages include the cost of the stove and labor.

Solar

The Bureau of the Census reported that shipments of solar collectors totaled 179,141 units in 1982, the latest year for which figures are available. This represents a 29.7% drop from the 1981 total of 254,768 units.

Of the total shipped in 1982, low-temperature collectors designed to operate at temperatures below 110°F accounted for 39%, or 70,313 units. Low-temperature collectors, however, accounted for only 16.6% of the total value of solar collector shipments ($10,088,000 of $60,716,000). The 1981 low-temperature collector share was 46% of the total.

Of the 108,828 medium-temperature collectors shipped in 1982, or 60.7% of total shipments, 96,306 (88.5%) were liquid collectors and 12,522 (11.5%) were air collectors. Medium-temperature collectors operate between 100° and 180°.

No figures were available for high-temperature collectors operating at temperatures above 180°, including concentrating and evacuated-tube collectors, because they might disclose figures for individual companies.

The solar collector record, in units:

1978	170,611	
1979	226,659	up 33%
1980	303,102	up 34%
1981	254,768	down 16%
1982	179,141	down 30%

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Related products

Sales bookings for industrial air pollution control equipment has spiraled downward precipitously in recent years, according to the Industrial Gas Cleaning Institute (IGCI).

Because of timing between issue dates and data availability, The News has been running a year behind on data in the past. This year, however, we can report 1983 data along with 1982 data not previously published by this publication.

Total new orders for 1983 amounted to $275.6 million, down 13.3% from the $317.9 million in new orders reported for 1982. This represented a 30% decline from the 1981 total of $455 million. The total for 1983 represents bookings for 32 companies, six more than in the previous year.

Booking value of electrostatic precipitators, at $24.9 million in 1983, was down 82% from $136.9 million a year earlier. The 1982 figure represented a 19% increase over the previous year's booking value of $115 million.

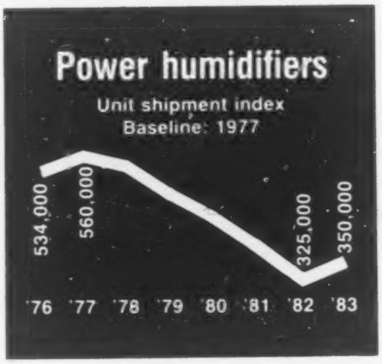
The value of fabric filters, at $35.8 million in 1983, represented a 46.5% decline from the $66.9 million value in 1982, which also represented a 42.6% drop from the 1981 value of $116.7 million.

Flue gas desulphurization equipment bookings of $191.7 million in 1983 represented a 114% improvement over the 1982 value of $89.6 million. The 1982 value was 51% below the 1981 total of $184.4 million. The level of bookings in this category in 1979 was $404 million.

The value of gaseous controls bookings in 1983 was $6.1 million, up 144% from the $2.5 million figure in 1982. The 1982 figure represented a 38.8% increase over the $1.8 million recorded in 1981.

Mechanical collector shipment values, at $8.4 million in 1983, were down only 1.2% from the previous year's value of $8.5 million. The 1982 value, however, represented a 35% decline from the 1981 total of $13.1 million.

Wet scrubber bookings, at $8.7 million in 1983, were down 35.6% from $13.5 million in 1982. That year's value was 42% less than the $23.2 million total recorded in 1981.



The IGCI statistics cover new orders for installations in the U.S. and Canada. All orders include bare flange-to-flange hardware with the exception of flue gas desulphurization equipment, which includes the total contract value.

Power humidifiers

The first glimmer of an improvement in consumer spending and a much improved new home market were responsible for an estimated 8% improvement in power humidifier shipments last year to 350,000 units. The revised total for 1982 is 325,000 units.

This product, although primarily an add-on unit, often is installed soon after a new or used home is purchased by people who, for reasons of health or comfort, feel they want the benefits of humidification.

One of the problems power humidifiers likely will face in the future is the growing number of tight homes with heavy layers of insulation. This forces contractors to size humidifiers carefully if they are to avoid condensation or, in the case of superinsulated homes, it may be necessary to avoid a humidifer altogether in favor of a dehumidifier or fixed ventilation rate to get rid of humidity build-up in the home.

On the plus side of the ledger, however, is the fact that home construction will hold at high levels for at least another year and an increasing percentage will be built in northern climates favorable to humidifier sales.

Looking ahead, we expect a similar 8% percent for 1984, which would bring shipments up to about 380,000 units.

For the record, the Bureau of the Census reported that 305,753 power humidifiers were shipped in 1982, the latest year for which figures are available, down 23% from the 396,413 units shipped the previous year.

Fans

The Air Movement Division of the Air Movement and Control Association (AMCA) showed decreases in two of its three categories in 1983, while the Air Control Division shipments showed little dollar value difference.

Shipments of centrifugal fans, at $104,881,342 last year, showed a 15.6% decline from the 1982 value of $124,220,104.

Industrial axial and propeller fan shipments, at $56,755,570 in 1983, were 0.2% below the previous year's total of $56,867,239.

The value of power roof ventilator shipments in 1983 was $57,157,440, or 9.8% more than the $52,034,093 worth shipped in the previous year.

Shipment values for louvers, dampers, and shutters, at $51,475,125 in 1983, was almost dead even with the 1982 total of $51,270,031.

AMCA in 1978 eliminated fans ship-

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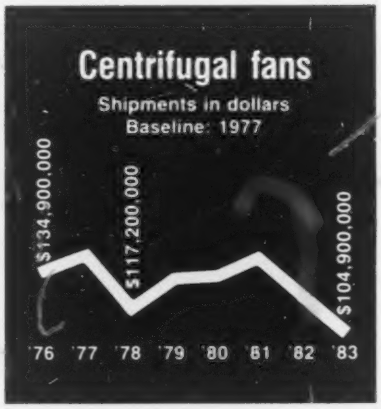

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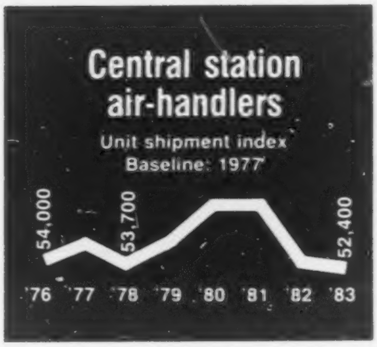
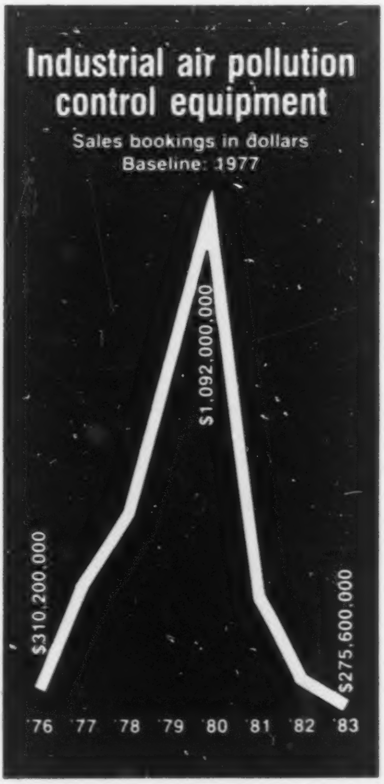


FROM PAGE 104

ped to the power generation market and placed them in another category which is not reportedly publicly.

Central station air handlers

Shipments of central station air handlers, which declined by 18.5% in 1982 to 53,000 units, held steady last year at 52,500 units. Look for a drop in 1984, although it may be no more than 5%.



Electronic air cleaners

Total shipments of electronic air cleaners (eac's) improved by 20.5% last year to 106,000 units. The 1982 total was 88,000 units. This was the first increase in the eac market since 1978.

Although the improvement in housing activity was credited with much of the turnaround, eac marketers hope that increased public attention to indoor air quality will bring eac's out of the marketing doldrums. In addition to cleaning all but a trace of airborne dust and pollen from indoor air, eac's also do a good job on the worrisome indoor pollutants radon and formaldehyde.

The electronic air cleaner also has a special compatability with heat pumps because of its ability to keep the indoor coil clean in winter when it runs under dry conditions.

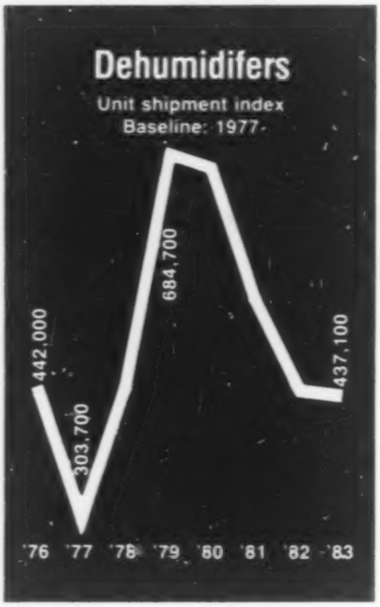
A negative impact, however, may be that homeowners who might have bought an electronic air cleaner instead may elect to spend their money on increased efficiency for their furnace or air conditioner.

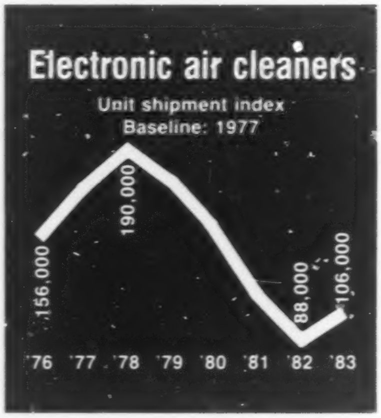
Looking ahead, we see an increase in eac shipments this year of about 6% to 112,000 units — still a distance from the 190,000 shipped in 1978.

Dehumidifiers

Shipments of dehumidifiers, which reached a peak of 684,700 units in 1978, held steady in 1983 at 437,100 units. The 1982 total was 439,800 units, or only 0.6% higher, according to the Association of Home Appliance Manufacturers (AHAM).

It might be noted that, in its last report, the Bureau of the Census reported that 408,956 dehumidifiers were shipped in 1982, down 24.3% from the 540,386 units shipped in the previous year.





Each Statistical Panorama includes the latest data available. Sources frequently revise their previous year's figures, which explains apparent discrepancies between the latest and earlier published data. Where sources give significantly varying information, that data is mentioned.

Comfort and construction

In 1980 we advanced a theory that the U.S. already was well advanced in the first of three transitional phases in which influences related to energy cost and availability were triggering significant changes in approaches to marketing home comfort systems.

It was an awareness of the need for change to avert needlessly high energy costs. The second phase — departures from traditional equipment to designs based on new technology and a growing consumer willingness to pay more for higher efficiencies — has its beginnings in 1979 but would not, we felt then, fully develop for a few years beyond that point.

The third phase, as we saw it, would begin about 1983 and last into the forseeable future. It would be a time when consumer and government education would be largely complete so that the job of providing substantially more efficient comfort heating-cooling systems for new and existing homes could go forward according to the natural dictates of the marketplace.

The industry is both on time and on target. Government, too, is generally moving in the right direction but, characteristically, still does not believe that a free market can do the job.

Heating

In the days of cheap and abundant natural gas, there was little incentive to purchase anything better than an inherently reliable atmospheric gas furnace or boiler with a standing pilot that, in most cases, burned all summer to keep rust and dampness from the heat exchanger.

These atmospheric furnaces and boilers had a steady-state efficiency of 80% but, on an annual basis, they had to press hard to achieve efficiencies in the 60% range.

With the first stage of natural gas decontrol in 1978 — a move to stimulate new gas supplies and clear the availability logjam that had produced increasingly severe curtailments for a decade — came steep gas price increases. Gas price escalation over the past decade has been more than 400%, most of it since 1978 but, if inflation is discounted, the real increase is in the order of 111%.

The first solution was an intermittent ignition device (iid) to replace the standing pilot. It raised seasonal efficiencies to the 67% to 71% range. Then a vent damper added to the iid raised seasonal efficiencies still more to the 71% to 80% range.

The next stage was a family of furnaces with power burners or recuperative heat exchangers that established a new high-efficiency class. The seasonal range was 80% to 86%, or just short of condensing the flue gases.

A pulse combustion boiler had been on the market for two years when, in

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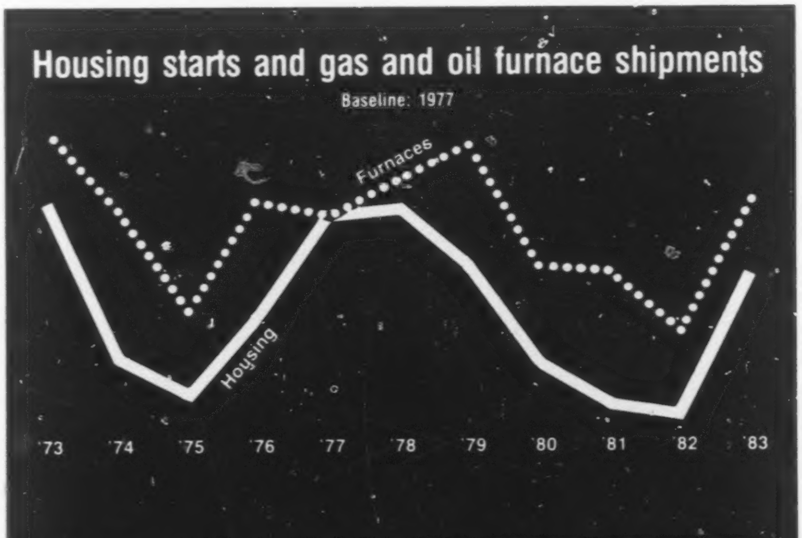
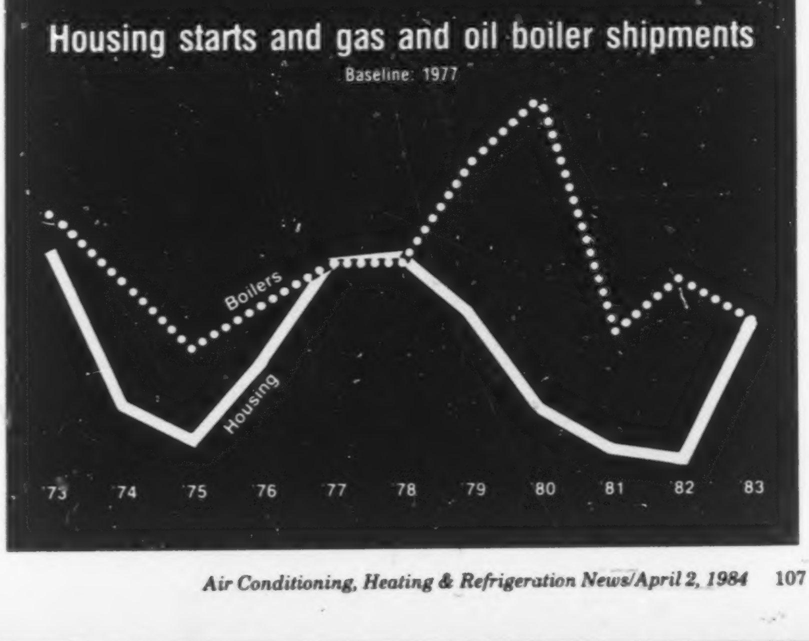

Housing starts and gas and oil furnace shipments

Baseline: 1977


Housing starts and gas and oil boiler shipments

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FROM PAGE 107

Projected national average heating costs by fuel type (expressed in constant 1983 dollars per million Btu)

Year	Natural gas	Fuel oil	Electric resistance	Electric heat pump
1983	4.21	6.07	9.76	5.62
1984	4.31	6.71	11.35	6.55
1985	4.49	6.37	11.49	6.62
1986	4.24	6.42	11.43	6.60
1987	3.98	6.47	11.23	6.46
1988	3.86	6.54	11.29	6.52
1989	3.76	6.60	11.25	6.48
1990	3.69	6.66	11.17	6.43
1991	3.86	6.71	11.27	6.50
1992	4.03	6.76	11.28	6.51
1993	4.05	6.81	11.38	6.55

PROJECTIONS are based on the assumption that family size and family characteristics are the same as for the stock of gas-heated homes. Fuel consumption is assumed to be affected only by the relative efficiencies of the heating equipment. The assumed relative efficiencies: gas 65%; oil 64%; electric resistance 98%; and electric heat pumps 170%.

mid-1982, it was joined by a pulse combustion furnace and another condensing furnace design. A new ultra high-efficiency class was born in the 86% to 96% seasonal efficiency range.

Within a year, virtually all manufacturers will be offering high-efficiency furnaces and boilers through the 86% noncondensing range and most will be able to offer an ultra high-efficiency condensing model. A new heat pipe furnace design, for example, needs only to add more heat exchanger surface to move from noncondensing to condensing if the manufacturer should decide there is enough demand.

It has been quite a turnaround for a home heating industry that, for 35 years, turned out virtually the same atmospheric furnace or boiler designs with standing pilots.

These developments have been watched with more than passing interest by consumers eager for ways to control fast-rising fuel bills. Within the past two years, a whole new gas furnace market has evolved that centers around the replacement of healthy-but-inefficient furnaces with units boasting much higher efficiencies.

We estimate that, in 1983, this market accounted for about 250,000 furnaces, or 15% of total shipments. This year that market could grow to 365,000 gas furnaces, or 20% of total shipments.

If there is a cloud on the horizon, it is the problem of condensation within the venting system of noncondensing furnaces in the 83% to 86% seasonal efficiency range and in the heat exchangers of condensing furnaces that use indoor air for combustion. The problem, premature corrosion of heat exchangers and venting systems, is caused by a wide range of indoor air contaminants that produce acids in the condensate that, in turn, attack the furnaces and masonry chimneys.

Partial solutions include new plastic venting systems and standards, better stainless steel formulations for heat exchangers, and furnace designs that make sure flue gas temperatures never reach the condensing zone even in outside-wall masonry chimneys. Some units use outdoor air for combustion on grounds that it has much less corrosion potential and is more predictable.

A 1984 study by the Policy Evaluation and Analysis Group of the American Gas Association (AGA) suggests that future increases in national average residential gas costs (see also "Fuels and energy") are likely to be much lower than the increases experienced over the past 10 years because of a moderating trend in the unit price of gas and more efficient appliances.

In fact, says AGA, residential gas bills are projected to increase more slowly than general inflation over the next 10 years – and continue to be much lower than the cost of competing fuels. For example, national average expenditures for gas are expected to be only 60% as high as for oil and the electric heat pump and less than half of the cost of operating electric resistance heat.

Put another way, AGA predicts the national average cost of gas heat in 1987 will be $398 per year (in constant 1983 dollars) while electric heat pumps will cost $646 annually for heating, oil $647, and electric resistance heat $1,123. (For the full 1983-1993 picture, see the accompanying table.)

AGA holds that, in 1987, families earning less than $7,000 annually will pay 8.3% of their income for gas heat, 14% for heat pumps, 15% for oil, and 25% for electric resistance heat. But for families earning $29,000 annually in 1987, gas heat will cost 0.84% of their income, oil 1.4%, electric heat pumps 1.5%, and electric resistance heat 2.7%.

Elsewhere on the heating front, it's estimated that more than eight out of 10 oil burners being sold today are flame-retention head or other high-efficiency types. Oil furnaces and boilers, which were almost knocked out of the box by the floodtide of conversions to gas during the early 1980's, are making a modest comeback, mostly in the Northeast.

Electric furnaces, which for many years replaced electric resistance baseboard and ceiling cable systems, now are playing second fiddle to heat pumps, which have captured an ever-increasing share of the new home market (28.5% of new single-family homes completed last year and about 21% of multifamily completions). In many heat pump installations, the electric furnace provides the backup heat source.

The initial reason for the popularity of the air-to-air heat pump was the lack of natural gas availability in most markets until after 1978. But with half of new home construction over the past few years in the South, which requires a lot of cooling and minimal heating, the heat pump retained its popularity. Another major factor was the trend toward condominiums and garden apartments.

Another trend that's still in its infancy is the replacement of split-system comfort cooling units with split-system heat pumps on gas and oil furnaces. The heat pump provides summer cool-

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FROM PRECEDING PAGE

ing and also provides heating when ambients are 35°F or above. The actual cutoff point would depend on the relative prices of the fuels.

Gas utilities dislike the arrangement intensely and have tried unsuccessfully to put demand charges on such installations on grounds that they lose all spring and fall revenues yet are required to have gas available when the weather is coldest and demand is at its peak.

Some electric utilities are offering incentives to homeowners and contractors to add heat pumps to fossil fuel-fired furnaces. Meanwhile, in California, gas and electric utilities are arguing before the State Energy Commission over whether heat pump efficiencies are as good as advertised. AGA has initiated a major field study to further investigate the matter.

Obviously, the battle of the fuels has warmed up again.

In fact, the gas industry has devoted a lot of time and money to the development of a gas-fired heat pump that could compete with electric air-to-air heat pumps. Although technically feasible now, the Gas Research Institute reports that a gas heat pump still is some years away because, in order to justify its first-cost premium, it should be more efficient than its electric counterpart. And with the efficiencies of electric heat pumps moving steadily upward, they make a difficult moving target.

Even though they are sold in much fewer numbers than other heating systems, water-source heat pumps are making themselves felt in some northern markets. Most of the early "cold water" units used water from a well, pond, or the ocean, and water quantity and quality usually was an unknown until the job was started.

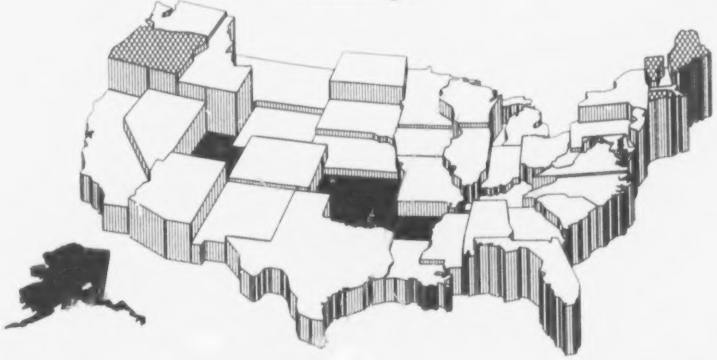
For this reason, water-source heat pumps were largely a rural phenomenon. Within the past two or three years, however, researchers and some enterprising entrepreneurs have developed vertical and horizontal closed loops (using polybutylene pipe and a water-glycol solution) that makes the system practical for a city lot.

Such systems provide ultra high-efficiency cooling and efficient heating without the need for back-up heat. But a high initial cost — about two to three times the cost of a high-efficiency gas furnace — promises to limit this market.

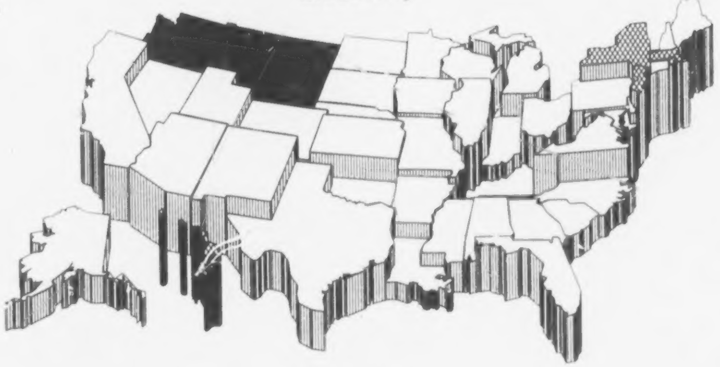
Although many states now have banned the installation of gas furnaces with standing pilots, the U.S. Department of Energy (DOE) determined that minimum efficiency standards for furnaces and boilers are not necessary. Labels and fact sheets that determine the relative efficiencies of

Residential energy prices by major energy source

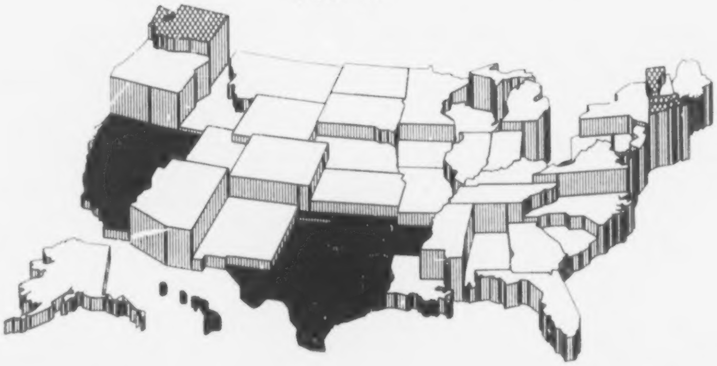
Natural gas



Electricity



Fuel oil



THOSE STATES with the lowest values are represented as having no elevation (deeply shaded areas) and those states with the highest values have the maximum elevation (cross-hatched areas) in these maps prepared by the Energy Information Administration. The maps reflect 1980 data.

these units are, however, required by the Federal Trade Commission.

About half of the states are not happy with this arrangement. In all, 23 states have petitioned DOE for exemptions from the no-standard rule so they can set their own minimums, a move that's being strongly resisted by manufacturers who would face the task of meeting varying efficiency standards.

It might be noted, too, that a poll of 3,300 home buyers released by the National Association of Home Builders (NAHB) showed that 74% of respondents considered energy efficiency "very important" when considering a new home purchase.

Cooling

In the late 1960's and early 1970's condenser surfaces on central air conditioners got smaller and condenser fan speeds got higher as manufacturers tried to hold the line on price in a competitive market dominated by builder purchases. The EER's (energy efficiency ratios) didn't matter so much as long as the first cost was low. Electricity was cheap and, after all, the builder didn't have to pay the utility bills.

But as electricity cost spiraled upward, particularly in the South where cooling seasons are long, the industry began developing equipment to meet the new needs. In the early stages, the builder market held to the low-cost, low-efficiency units. Manufacturers developed units with higher efficiencies for the replacement and add-on markets where consumers were more demanding.

Condenser surfaces soon were expanded and multiple-speed condenser fans were added, moves that made outdoor units much quieter as well. Compressors were improved and two-speed models were offered by several manufacturers. Larger commercial equipment began to routinely come equipped with multiple compressors to provide more modulation.

The performance of heat pumps, particularly in northern applications, was improved. Cooling performance, although still a compromise, was upgraded to the point where it rivalled the best straight cooling units. Compressors were beefed up to better take the rigors of more defrosts in harsher northern climates. Defrosting methods and controls were improved. One

TURN TO PAGE 115

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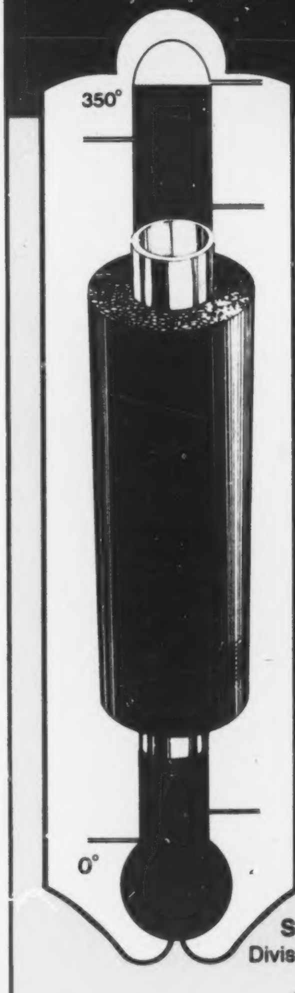

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deluxe design even included an inverter drive.

According to our records, these moves started to show in the marketplace in 1973, which meant that laboratory work and field tests were going on long before that. We arbitrarily picked an EER of 7.5 as the line separating high-efficiency equipment from the rest and, until 1976, we doubt that much more than 15% of the equipment shipped was in that category.

That picture has changed dramatically.

The Air-Conditioning and Refrigeration Institute (ARI) reported that, through the first nine months of 1983, 83.7% of all residential unitary air conditioners (under 65,000 Btuh) shipped by U.S. manufacturers had an SEER (seasonal energy efficiency ratio) of 7.5 or more. Of the total, 41.5% had SEER's of 8.5 or more, and 6.2% had SEER's of 9.5 or more.

Similarly, through the first nine months of 1983, 86.5% of air-to-air heat pumps with capacities of less than 65,000 Btuh shipped by U.S. manufacturers had SEER's in the cooling mode of 7.5 or more. And two out of 10 heat pumps in this size range had cooling-mode SEER's of 8.5 or more.

Back in 1976, only 23.4% of unitary air conditioners shipped had an EER of 7.5 or more and only 5.2% had EER's of 8.5 or more. In the same year, only 10.6% of residential heat pumps had a cooling-mode EER of 7.5 or more and only 4.5% had an EER of 8.5 or more. The upward progress of efficiencies has been relentless since 1976.

Although some states such as California and Florida have established mandatory minimum efficiencies for comfort heating and cooling equipment, we doubt that these regulations have had more than a minor impact on raising the overall efficiencies of

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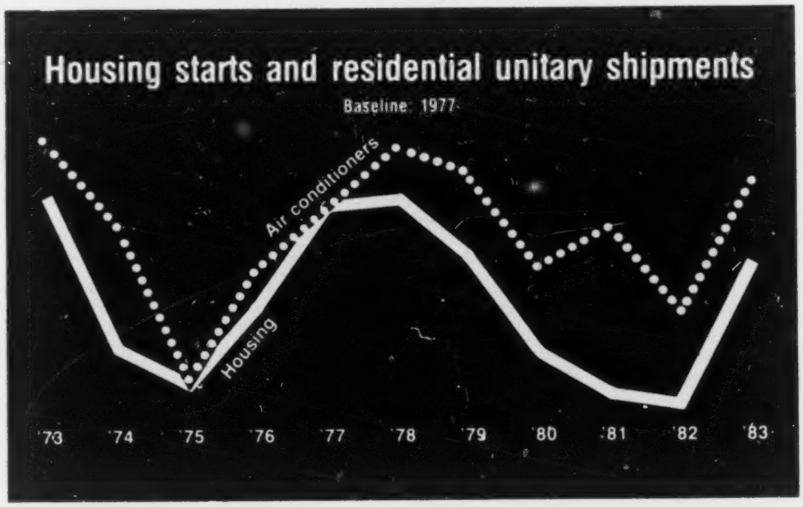

An industry's efficiency record

All unitary air conditioners of 65,000 Btu/h and under

EER and SEER	% 1976	% 1977	% 1978	% 1979	% 1980	% 1981	% 1982	% 1983
7.5 and over	23.4	30	36	43.9	49	58	82.8	83.72
8.5 and over	5.2	5.7	10.2	13.2	15.6	23.9	42	41.5
9.5 and over	0.03	0.35	2.02	1.5	2.7	4	4.4	6.16

Unitary heat pumps of 65,000 Btu/h and under

7.5 and over	10.6	14.8	35	39.6	54.5	72	82.7	86.5
8.5 and over	4.5	0.4	0.4	0.6	2.3	2.8	9	19.1

Split-system air conditioners 65,000 Btu/h and under

7.5 and over	28.2	31.7	41.2	43.6	45.9	55	81.77	82.55
8.5 and over	6.3	6.9	12.2	12.2	15.8	21.4	41.6	41.6
9.5 and over	0.02	0.4	2.5	1.8	3	4.7	5.14	7.12

NOTE: Statistics for the years 1976 through 1980 are based on EER's (energy efficiency ratios) and those for 1981 through 1983 are based on SEER's (seasonal energy efficiency ratios). Percentages for 1983 are based on shipments for the first nine months; other years reflect shipment totals for all 12 months.

Heating-cooling-fuel new home characteristics

(Based on two quarters revised, one quarter preliminary Census Bureau figures. All numbers are rounded.)

	1982					1983				
	U.S. total	Northeast	North Central	South	West	U.S. total	Northeast	North Central	South	West
Single-family homes completed	**442,000**	53,000 11.9%	65,000 14.7%	238,000 53.8%	86,000 19.4%	**641,000**	74,000 11.5%	91,000 14.2%	336,000 52.4%	141,000 21.9%
Space heating fuel										
Gas	179,000 40.4%	21,000 39.6%	38,000 58.5%	77,000 32.3%	43,000 50.0%	280,000 43.7%	28,000 37.8%	60,000 65.9%	119,000 35.4%	74,000 52.5%
Electricity	222,000 50.2%	18,000 33.9%	17,000 26.1%	152,000 63.9%	36,000 41.9%	314,000 50.0%	27,000 36.5%	21,000 23.1%	208,000 61.9%	58,000 41.1%
Oil	12,000 2.7%	9,000 16.9%	3,000 4.6%	— —	— —	14,000 2.2%	12,000 16.2%	2,000 2.2%	— —	— —
Other/none	31,000 6.3%	5,000 9.6%	9,000 10.8%	8,000 3.8%	8,000 8.1%	33,000 4.1%	7,000 9.5%	8,000 8.8%	9,000 2.7%	9,000 6.4%
Heating systems type										
Warm air furnace	235,000 53.1%	17,000 32.1%	44,000 67.4%	126,000 52.9%	47,000 54.7%	361,000 56.3%	25,000 33.8%	67,000 73.6%	187,000 55.7%	81,000 57.4%
Heat pump	118,000 26.6%	6,000 11.3%	5,000 7.6%	84,000 35.3%	24,000 27.9%	183,000 28.5%	10,000 13.5%	9,000 9.9%	122,000 36.3%	40,000 28.4%
Hydronic	18,000 4.0%	16,000 30.1%	2,000 3.0%	— —	— —	24,000 3.7%	18,000 24.3%	3,000 3.3%	— —	1,000 0.7%
Electric baseboard/ panel/radiant	34,000 7.7%	14,000 26.1%	15,000 23.0%	10,000 4.2%	7,000 8.1%	40,000 6.3%	16,000 21.6%	7,000 7.7%	11,000 3.3%	7,000 4.9%
Other/none	37,000 8.6%	3,000 0.4%	7,000 0.4%	20,000 7.6%	7,000 9.3%	33,000 5.2%	5,000 6.8%	5,000 5.5%	16,000 4.7%	12,000 8.6%
With central air conditioning	294,000 66.5%	15,000 28.3%	29,000 44.6%	204,000 85.7%	46,000 53.5%	449,000 70.0%	23,000 31.0%	44,000 48.4%	303,000 90.2%	77,000 54.6%
Multifamily homes completed	**269,000**	23,000 8.5%	38,000 14.1%	147,000 54.6%	61,000 22.7%	**330,000**	24,000 7.3%	44,000 13.3%	193,000 58.5%	69,000 20.9%
Space heating fuel										
Gas	76,000 28.2%	12,000 52.1%	25,000 65.7%	15,000 10.2%	26,000 42.6%	94,000 28.5%	13,000 54.2%	28,000 63.3%	23,000 11.9%	30,000 43.5%
Electricity	183,000 68.0%	8,000 34.7%	12,000 31.5%	130,000 88.4%	33,000 54.0%	231,000 70.0%	8,000 33.3%	16,000 36.7%	170,000 88.1%	39,000 56.5%
Oil	5,000 1.8%	3,000 13.2%	— —	1,000 0.6%	— —	3,000 0.9%	3,000 12.5%	— —	— —	— —
Other/none	5,000 1.8%	— —	1,000 2.8%	1,000 0.6%	2,000 3.4%	2,000 0.6%	— —	— —	— —	— —
With air conditioning	238,000 88.4%	16,000 69.5%	31,000 81.5%	143,000 97.3%	46,000 75.4%	294,000 89.0%	15,000 62.5%	34,000 77.3%	190,000 98.5%	54,000 78.4%

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shipments nationally. The progression upward simply was too regular, and there were no sudden shifts when state regulations came into force.

As an aside, it might be noted that the requirements of ASHRAE Standard 90A-1980, Energy Conservation in New Building Design, which forms the basis for more than four out of five state energy codes, calls for a minimum SEER of only 6.8 through the end of 1984, when it moves to 7.8.

California would like to see a mandatory minimum SEER of 8.5 for central air conditioners and 8 for heat pumps. The average SEER for all unitary air conditioners under 65,000 Btuh capacity shipped last year was 8.4 and, for heat pumps, it was 8.2. These figures are in sharp contrast with the 1976 averages of 7.03 and 6.87 respectively.

A major factor in the acceptance of higher efficiencies, at a significantly higher cost, has been the multitude of incentive programs launched by summer-peaking electric utilities seeking to postpone the addition of more generating capacity. They find it less expensive to pay a homeowner or contractor $300 to $400 for installing high-efficiency equipment than to pay up to $1,500 a peak watt for new power plants. In the process, the homeowner recovers most of the first-cost premium for the high-efficiency equipment.

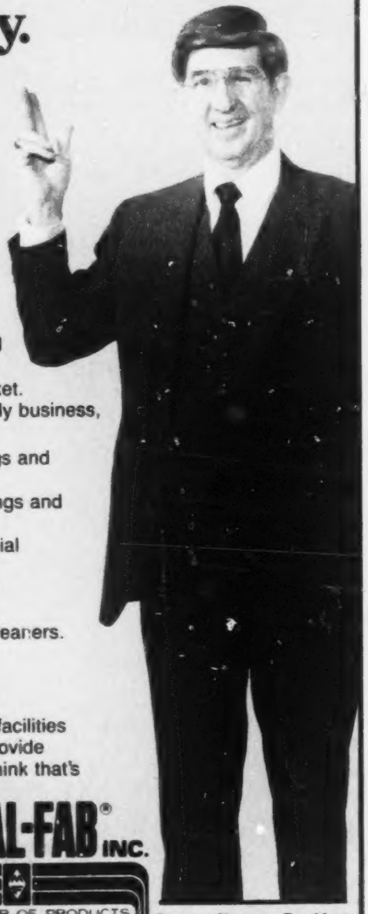
Of much less value, in our opinion, has been the residential conservation service (RCS) home energy audit programs offered by many utilities either free or for a token charge that's about one-fifth the real cost. The rest of the cost is made up by the ratepayer base.

Testimony before congressional committees revealed that many home energy audits are conducted for middle class homeowners looking for confirmation — and a pat on the back — of energy conservation steps they already have taken.

Similarly, the fact sheets mandated by the Federal Trade Commission for furnaces and boilers also have been a flop, according to a General Accounting Office report to Congress. A survey it conducted revealed that 80% of contractors operating in cold climates said they used the fact sheets occasionally or never.

Housing characteristics

Again this year, The News has been



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FROM PRECEDING PAGE

able to obtain from the Bureau of the Census the characteristics of new homes completed during the first nine months of the previous year. The accompanying table on page 116 contains both national figures and, because these statistics have an annoying habit of clouding local experience, a regional breakdown as well.

As might be expected, the report shows a dramatic increase in the number of homes completed, from 442,000 single-family and 269,000 multifamily units completed during the first nine months of 1982, to 641,000 single-family and 330,000 multifamily units completed during the first nine months of last year.

Looking at fuels for single-family homes, gas increased its share by 3.3% to 43.7%, mostly at the expense of oil and other fuels. Similarly, electricity made a 2% gain to 70% of multifamily units, also at the expense of oil and other fuels.

Although heating systems remained fairly constant, warm air furnaces gained 3.2% to 56.3% of single-family homes and heat pumps moved from 26.6% to 28.5% of single-family homes. Both hydronic and electric resistance baseboard systems dropped slightly and other systems, which do not use any of the three conventional fuels, dropped from 8.6% in 1982 to 5.9% in 1983. Most of the other systems are located in the South and West.

The penetration of central air conditioning, at 70% in 1983, was up from 66.5% a year earlier and reflects added penetration in all four regions. Today more than nine of 10 single-family homes being built in the South have central air conditioning. Importantly, however, nearly a third of those being built in the Northeast and about half of those being built in the West and North Central states have central air conditioning systems.

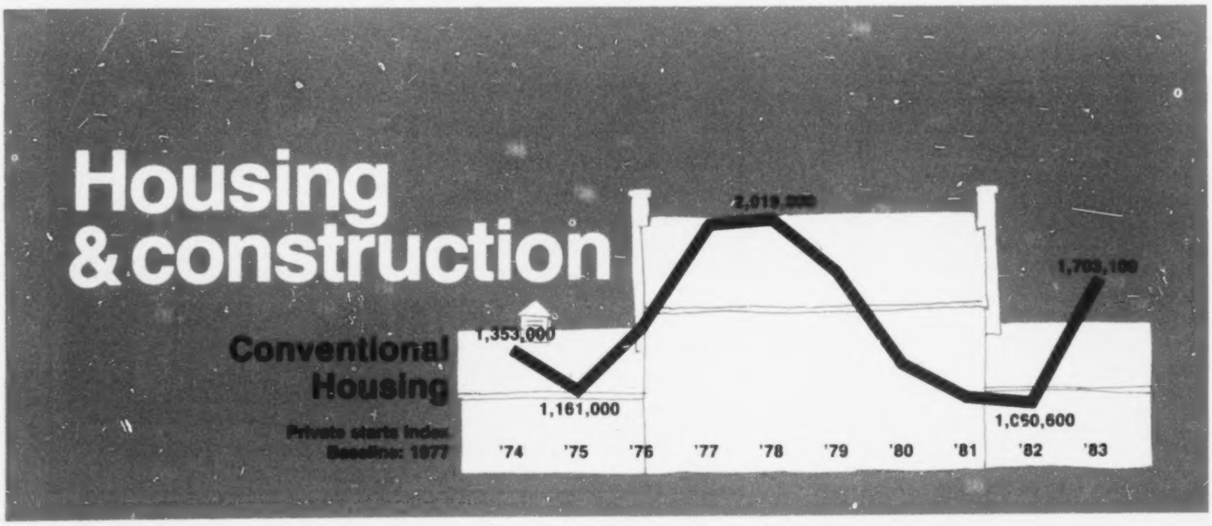
Air conditioning penetration in multifamily dwellings completed in the first nine months of 1983 was 89%, up from 88.4% in 1982. Again, 98.5% of those in the South were air conditioned. But the 62.5% share in the Northeast was done from 69.5% a year earlier. More than three out of four multifamily units in the North Central and West regions were air conditioned.

In a special Bureau of the Census study, it was revealed that, in 1979, heat pumps were used in 24.8% of the 386,000 electrically heated multifamily units completed this year. In 1980, heat pumps were used in 27.7% of electrically heated multifamily units. This is the basis for the 21% multifamily heat pump penetration rate used by The News in its simulations.

The same study also revealed that, of the 476,000 air conditioned multifamily units completed in 1979, room air conditioners were used for 16.8%; a central system serving the entire building was used for 7.6%; and 75.6% were central systems in each apartment. In 1980, the percentages for the 460,000 units completed that year were: room units 12.2%; building central systems 7.8%; and apartment central systems 80%.

It might be noted, too, that heat pumps continue to be largely a southern and western phenomenon. The South accounted for about two-thirds of single-family heat pump systems installed last year, and the West accounted for about one-fifth. The North Central states and the Northeast accounted for only about 5% each.

Housing & construction



The twin dampers of high interest rates and tight money that had put a steadily tightening lid on prospective home buyer desires since late 1978 eased a bit in 1983, and consumers responded by producing the fastest industry turnaround since 1946.

Last year's 60.3% increase in housing starts — from 1,060,600 units in 1982, the second year at that depressed level, to 1,703,100 units last year — also established housing as the flagship of the nation's economic recovery. The recovery in housing promises to continue through this year and, depending on what happens to federal deficits, will decline by only 10% to 15% in 1985 to a still-respectable level.

Mortgage rates, which peaked at 17.5% in mid-1982, dropped to as low as 11.5% late that same year. The demand for shelter, which had been pent up for the longest period since the Depression, broke loose and, despite interest rates that edged upward to 13% and a bit beyond, it continued strong in all sections of the country.

In addition to a stable mortgage market with ample funding, a fundamental change is taking place in the way people buy homes. In contrast to three years ago, when 95% of all mortgages were at fixed rates for 30 years, almost half of today's new home buyers have accepted some form of adjustable-rate mortgage. The prime motivator is a rate of about 2.25% less than for fixed-rate mortgages.

For the second year in a row, the biggest cloud on the horizon is the size of the federal deficit. Although some feel growth in the economy could keep the deficit as low as $165 billion, others fear the federal deficit could top $200 billion. In either case, there is fear that pressure on the nation's money supply — especially with growing consumer confidence and increasing interest in industrial expansion — will drive interest rates up and so force sharp decreases in expenditures for both new and existing homes.

1983 experience

Private housing starts, which declined precipitously to about half of peak 1978 levels in both 1981 and 1982, recovered dramatically in 1983 to 1,703,100 units. This represented a 60.3% increase from the 1982 total of 1,062,200 units, or 640,900 more housing starts than in the previous 12 months.

Single-family housing starts in 1983 totaled 1,066,900 units, up 61% from the 662,600 single-family units started in 1982. Although still well below the 1.43 million level of 1978, at the end of which the Federal Reserve Board put strong clamps on credit and sent interest rates into the

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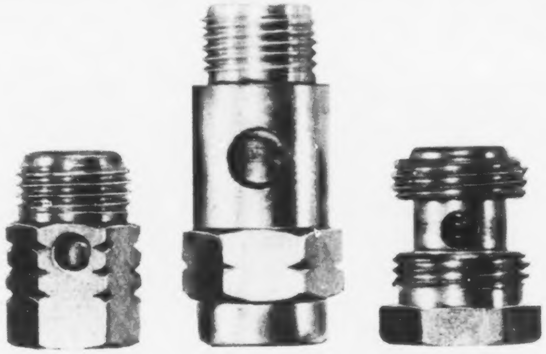

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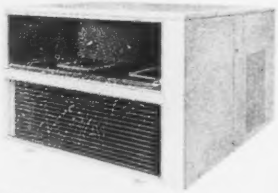

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stratosphere, it would appear that the 1983 level will be sustainable for at least two years.

Multifamily starts matched the growth of single-family homes last year, but the outlook in this area is not quite so bright. The 636,200 multifamily starts in 1983 represented a 59.2% increase over the 399,600 starts in the previous year. And despite some weaknesses in the condominium market, particularly in the South and West, the total is well within historical averages.

Geographically, housing starts in 1983 were notable for the strength exhibited by regions other than the South, which has literally carried the rest of the housing industry on its back for more than two years.

The biggest increase, at 86%, came in the West, where housing starts increased from 205,400 in 1982 to 382,000 last year. The 1983 total still was far below the peak of 545,000 units in 1978. Starts in the South last year increased by 58%, from 591,000 in 1982 to 936,000 units last year.

The North Central states recorded a 46% increase in starts last year to 217,400 units, up from 149,100 units in 1982. Last year's total was still low when compared with the 1977 peak of 446,000 units. A 44% increase was recorded in the Northeast, where starts were up from 116,700 units in 1982 to 167,700 units last year. In the 1970's this region averaged 207,000 units.

1984 forecast

As seems to be the case more often than not, the fate of the housing industry is as much in the hands of the politicians as it is dependent upon market forces. In 1984, housing's future will depend in large measure on the federal deficit outlook and on the political forces at work in an election year.

The promise of continued high federal deficits almost certainly would influence the money markets to increase interest rates, a critical factor for a housing industry already pushed to the limits of mass market affordability. On the other hand, both the Reagan administration and the Federal Reserve Board have indicated there will be little change in credit policies in this election year. On balance, we feel the impact of the federal deficits will be pushed back to 1985.

Mortgage rates, which have been holding relatively stable since last summer at 13% for fixed-rate instruments and 11% for variable-rate loans, could ease by a half point or so later in the first half of this year, then edge upward toward year's end. It is unlikely there will be any sharp movement in either direction.

Given the level of uncertainty and present interest rates, we feel the momentum of the 1983 recovery will carry forward well into this year to produce 1,825,000 housing starts, up 7% from 1983. That's only 122,000 more units than last year — but more than 750,000 more than the depressed levels of 1981 and 1982.

This year's growth, however, probably will be uneven both geographically and in terms of mix. For example, the 1,175,000 single-family homes we expect to be started this year represents a 10% increase over last year's 1,066,900 units, while the 650,000 multifamily starts we expect this year represents only a 2% increase over 1983's total of 636,200 units.

We feel that, in the West, housing starts in 1984 will increase by 7% from 382,000 last year to 410,000 this year. The South probably will experience a 4% decline, from 936,000 to 900,000 units, primarily because multifamily units have been overbuilt in several key areas.

But in the North Central states, among the last to feel the recovery, we think a 38% increase from 217,000 units in 1983 to 300,000 units this year, is in order. Similarly, the Northeast should continue its recovery at a 28% rate, from 167,000 units in 1983 to 215,000 units this year.

It must be pointed out, however, that while the recovery years of 1983 and 1984 are quite respectable, they are still well below the total of 2,020,300 recorded in 1978 and 2,356,600 recorded in 1972.

Although economists differ on the severity of its impact, they all appear to agree that unless something is done to reduce the size of the federal deficit, higher interest rates and a return to financial instability are sure bets for 1985. Housing would be the first to suffer, they agree, if the borrowing needs of government, industry, and consumers should collide in the nation's capital markets.

But because 1984 is an election year, it's unlikely that Congress will do much more than talk about the issue until after the election in November. Growing economic health probably will result in a deficit in the $165 billion to $175 billion range in fiscal 1984, according to economist Leonard Santow, but even with full employment a structural deficit of $125 billion would remain. It's that structural deficit that must be attacked by Congress if money markets are to remain stable for the forseeable future.

The Federal Reserve Board, whose overreaction in 1978 started the slide in housing starts, has been attempting to smooth out economic policy so that it does not have to react to cyclical swings in the economy by tightening and loosening the money supply.

And because the Federal Reserve Board in 1984 won't be able to tighten the money supply without risking economic deterioration, or loosen it without jeopardizing its credibility as an inflation fighter, it's unlikely to affect money markets in any major way this year. Similarly, the administration is unlikely to invite either inflation or tighter credit policies in an election year.

There appears to be no doubt, however, that interest rates of 13% leave many prospective homeowners on the threshold of affordability. A slight increase in interest rates would have a comparatively large negative impact on the number of people who could qualify for a new home purchase. Similarly, a slight decrease in interest rates would add a comparatively large number to the pool of prospective home buyers.

An important positive development, however, has been the transformation of the mortgage marketplace from local and regional influences to national and international outlooks, thus smoothing out the notoriously sharp swings in mortgage money availability.

Deregulation and two years of losses that caused a wave of consolidations have resulted in a healthier group of savings and loan institutions that, in 1983, raised $3.7 billion in equity capital and reported net deposit increases of $100 billion. Too, savings institutions have become far more attuned to the secondary mortgage market. Of the $217 billion in mortgage originations last year, 66.4% went through secondary markets, more than double the average of

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previous years.

Another major factor has been the acceptance of variable rate mortgages. The Federal National Mortgage Association (Fanny Mae) reported that 43% of its 1983 mortgage commitments of $18.6 billion were in adjustable-rate instruments and that 12% of its $77-billion portfolio now is in adjustable-rate mortgages.

The acceptance of variable rate mortgages accelerated when lenders dropped the initial interest rates to about 2.25% below those of fixed-rate mortgages, agreed to a cap of 2% annual interest rate increases, and a 4% to [illegible]% lifetime interest rate cap.

Consequently, the housing industry would appear to be off the roller-coaster that has characterized the industry for many years. While few expect any more 2 million-plus years, they also do not expect any more 1 million-start years. Instead, good years should range from 1.7 to 1.8 million housing starts and poor years between 1.3 and 1.4 million units.

Local markets

Unlike 1983, the demand and supply of new homes will not be universal this year. On the supply side, some areas in the Northeast are experiencing shortgages of gypsum wallboard and many scattered communities across the country are reporting shortages in serviced land because of municipal cuts in water and sewer expenditures over the past few years.

Lean inventories of new homes made necessary by the very high interest rates prior to 1983 have already been expanded in most communities. In fact, a few areas have reported overbuilding, particularly in multifamily units. For example, Dallas-Fort Worth, Houston, and Phoenix, Ariz., are expected to have strong single-family markets this year, but multifamily markets are weak because rental vacancy rates have soared to between 10% and 20% in new developments. Colorado Springs, which became overbuilt in the late 1970's, shows signs of repeating the experience.

On the other hand, Chicago is expected to produce twice as many housing units this year as in 1982 and San Diego, Calif., another of the worst recession casualties, will produce nearly three times as many. Florida's markets, particularly in the South, appear to have regained their health, even though Orlando and Tampa may slip a bit.

Houston, the longtime leader in new home starts, dropped to second place last year behind Dallas-Fort Worth as petroleum-related activities slowed down. But even Dallas-Fort Worth, which recorded 109,100 starts in 1983, expects to produce only 84,100 starts this year. Houston had 58,300 starts in 1983 and expects 46,050 starts this year, according to the National Association of Home Builders (NAHB).

The 1983 records of the other leaders, with 1984 projections in brackets, follow: Atlanta, Ga., 41,950 (40,235); Phoenix, 43,000 (36,000); Washington, 27,535 (24,700); West Palm Beach and Boca Raton, Fla., 17,383 (22,900); Tampa-St. Petersburg, Fla., 23,050 (21,800); Chicago, 17,780 (20,400); Orlando, Fla., 20,560 (19,420); Denver and Boulder, Colo., 23,500 (19,000); San Diego, 14,050 (19,900); Los Angeles and Long Beach, Calif., 16,000 (18,000); Minneapolis-St. Paul, Minn., 15,900 (17,500); Miami, Fla., 12,690 (15,500); Baltimore, Md., 15,840 (15,180); Ft. Lauderdale-Hollywood, Fla., 11,786 (15,000); Riverside-San Bernadino, Calif., 14,500 (15,000); San Antonio, Texas, 15,950 (14,500); New York, 14,460 (14,185); and Philadelphia, 14,690 (14,000).

Pressure continues

New households in the 1980's are being formed at the rate of 1.4 million per year, somewhat below the record 1.7 million per year pace of the 1970's but still well above the 1.06 million per year average for the 1960's.

Surveys conducted by NAHB showed that, from July, 1982, to June, 1983, 44.8% of all new single-family homes sold were purchased by first-time home buyers and 56% of all condominiums were purchased by first-time buyers. This is up from 35% and 52% respectively for the same period a year earlier.

In 1980, the Census Bureau counted 80,359,000 all-year households, up 23% from 63,401,000 households counted in 1970. Population, on the other hand, increased by only 11% from 203,302,032 to 225,477,426 during the same period. The figures confirm the long-noted trend toward more one- and two-person households. The size of households also declined during the decade from an average of 3.11 persons in 1970 to 2.75 persons 10 years later.

There was a sharp shift in population to the Sunbelt states during the decade of the 1970's. The largest increases in households occurred in California (2.06 million), Texas (1.49 million), and Florida (1.46 million). These three states account for 17.3 million households, almost as many as the entire Northeast.

While the nation's population increased by 10.9% from 1970 to 1980, the Northeast held even at 49 million, the North Central States increased by 3.7% to 58.7 million, the South increased by 19.1% to 74.8 million, and the West increased by 23.4% to 43 million.

With the easing of credit restrictions and the trend toward later marriages, single women comprise one of the fastest growing segments of the home-buying market. According to projections of the Joint Center for Urban Studies of MIT and Harvard:

- From 1975 to 1990 the traditional one-worker husband-wife household as a percentage of all households will decline from 25% to 14%. From 1960 to 1975, the percentage dropped from 43% to 25%.
- Married couples will account for only 17% of all new household formations from 1975 to 1990. They accounted for 41% of all new households from 1960 to 1975.
- Almost two-thirds of the projected total of 1990 households will be without children.

An NAHB study of 1,800 single-family and 1,500 condominium home buyers polled from July, 1982, to June, 1983, revealed the typical new home buyer to be 33 years old and married with an income of $35,226 a year. The couple put 10% down on a $75,000 home located 27 minutes from work. Among the other findings:

- Traditional households (husband, wife, children) accounted for 51% of new single-family home buyers. Single parents and groups or unrelated individuals living together accounted for 16.4%. In 56% of the households, there were two incomes.
- Of the totals, 55% of condominium buyers and 47.5% of single-family home buyers were purchasing their first home. Median household income was $35,226 for single-family home buyers and $31,217 for condominium buyers.
- Energy efficiency was rated as a

"very important" consideration for 74% of new home buyers.

- Fixed-rate mortgages accounted for 63% of single-family and 48% of condominium sales. The monthly cost, including principal, interest, taxes, insurance, and utilities was $841 for single-family buyers and $651 for condominium buyers.
- The median household income for first-time single-family home buyers was $30,573 and that of a repeat buyer was $43,162. The median household income for a first-time condominium buyer was $29,316 and that of a repeat buyer was $34,667.
- Of the mortgages granted for single-family home buyers, 55% were FHA or VA and 31% were conventional. Of the condominium mortgages, 41% were FHA or VA and 44% were conventional.

Prices

The median price of a new home in 1983 was estimated by NAHB at $75,300, and increase of 8.7% compared to only a 3.9% increase in the consumer price index and an increase of only 0.6% over the span of the previous 12 months. The price of that same home in 1975 would have been $39,300.

The median price of an existing home, according to the National Association of Realtors, was $70,300 in 1983, or 3.8% more than the median price a year earlier. Median existing home prices were highest in the West ($93,800) and lowest ($56,200) in the North Central States. The median-priced existing home sold for $72,500 in the Northeast and $69,600 in the South. The same home sold for $35,300 in 1975.

New single-family homes completed in 1982 were smaller and had fewer amenities than those built in 1981, according to Census Bureau figures. The median 1982 home contained 1,520 sq ft, or 30 sq ft less than the 1980 median home and 135 sq ft less than a median-sized home built in 1978.

The median-sized apartment built in 1982 contained 925 sq ft compared to 930 sq ft in 1981 and 863 sq ft in 1978. The growth in multifamily unit sizes reflects the shift toward condominiums and cooperatives.

Multifamily

The 636,200 multiple housing starts last year kept pace with the increase in single-family starts and marked the largest annual total since 1973. In fact, activity in this area was reminiscent of the 1960's and early 1970's — and contrary to expectations.

Early Bureau of the Census figures, which showed an estimated total of 622,000 multifamily units, revealed this breakdown: 109,000 two- to four-family units; 513,000 units in buildings with five or more units, of which 160,000 were condominiums, 326,000 were nonsubsidized rental units, and 27,000 were subsidized (Section 8) units.

The small boom in multifamily units, nearly three times the level of the previous two years, cannot last. There are clear indications that the condominium market is overbuilt, particularly in the South and West, and vacancy rates for rental apartments climbed steadily in 1983.

Vacancy rates in the third quarter of 1983 reached 5.8% nationally, 8.3% in the South, and 7.2% in the West. Vacancies were particularly evident in large complexes.

There also has been a marked decline in the rate of condominium absorptions. The number of completed condominiums sold within three months of completion declined from 80% at the end of 1982 to 55% in the first quarter of 1983.

Condominiums have not done as well as expected in a strong housing recovery. NAHB surveys have consistently shown over the past several years that condominium sales were

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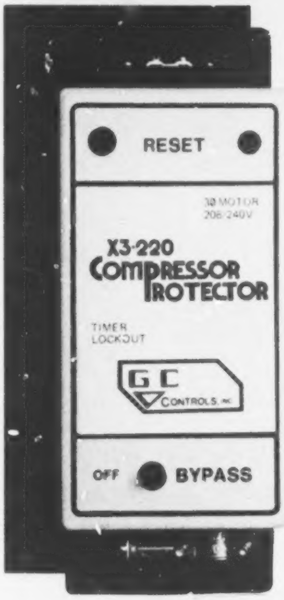

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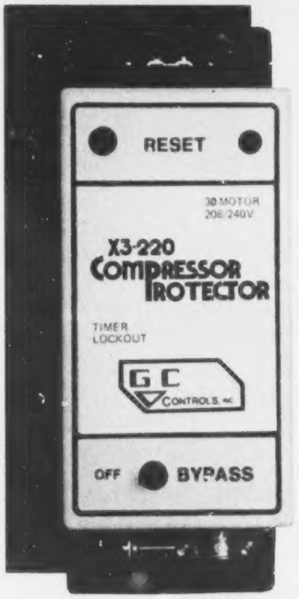

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Housing & construction

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not as strong as the sales of single-family homes or townhouses, which are grouped with the singles. The outlook for single-family home sales continues good while the outlook for condominiums (which are grouped under multifamily units) is not nearly so bright.

(NAHB estimated that 14% or 150,000 of the 1,066,900 single-family starts last year were townhouses. This included 7.5% fee-simple townhouses and 6.6% townhouse condominiums.)

In many areas of the country, builders still are sitting on a lot of unsold apartment-type condominiums. Particularly hard hit seems to be the middle and upper price levels. NAHB says the less expensive condominiums are still moving reasonably well "although the 1970's romance with condos has clearly soured."

Mobile homes

Shipments of mobile or manufactured homes in 1983 totaled 295,079 units, or an increase of 23.6% over the 238,808 units shipped in 1932, according to the Manufactured Housing Institute (MHI).

The continued strength of these site-delivered homes, popular with retired people and those with moderate incomes, has been maintained despite the recession. Although not counted in the official housing statistics, shipments of these homes amounted to 27.7% of the private singe-family site-built homes started in 1983, down 36% from the previous year.

The manufactured home market was significantly strengthened early in 1983 when regulations under Section 203 (b) of Title II of the National Housing Act were changed to allow 30-year FHA-insured loans with limits ranging from $67,500 to $90,000. FHA will insure 97% of the first $25,000 and 95% of the remainder.

MHI reports its major project today is to remove zoning barriers that prevent the placement of manufactured homes in many residential neighborhoods.

The association reported that 73% of manufactured home shipments were single sections and 27% were multiple sections. The share of single sections in 1982 was 79% and the multiples accounted for 21%.

The regional breakdown of shipments for 1983 showed: Northeast 16,930 units, up 39% from 12,181 units in 1982; East North Central 22,309 units, up 51% from 14,809; West North Central 13,656 units, up 33% from 10,302; South Atlantic 94,480 units, up 38% from 68,679; South Central 97,536 units, up 6% from 91,912; Mountain 20,890 units, up 21% from 17,333; Pacific 19,914 units, up 41% from 14,172; and Alaska 451 units, down 10% from 502 units in 1982.

The top markets for these homes in 1983 were: Texas 41,904; Florida 31,300; North Carolina 21,800; Georgia 15,700; Louisiana 13,600; South Carolina 12,300; and California 11,000 units.

Labor

A broad pattern of wage freezes, rollbacks, and the elimination of restrictive work rules in 1983 has resulted in the smallest average wage-and-benefit increases in more than 20 years for the unionized construction industry.

The Construction Labor Research Council (CLRC) reported the average first-year increase was 44 cents/hour, or 2.2%. If the work rule modifications are included, the average increase for the year was only 30 cents/hour, or 1.5%.

Even so, a 1983 survey of Mechanical Contractors Association of America (MCCA) members revealed that union mechanical contractors believe the concessions made by unions, although helpful, have not been enough to make them competitive with open-shop competitors.

The survey revealed that open-shop contractors in the past year have gained seven or eight percentage points in commercial, industrial, institutional, and federally assisted (Davis-Bacon) work. They reported that, when the economy fully recovers, employment in the union sector will not return to pre-1980 conditions.

The study also documented a belief that large numbers of United Association plumbers and pipefitters are working for open-shop contractors and are starting their own open-shop companies.

CLRC reported the first-year increase for construction trades in 1983 was less than half the $1.10, or 6.7%, negotiated last year. One-year contracts dominated the bargaining results, approaching 70%. But in multiyear contracts, there was a large jump in the size of the average increase for the second year — a new phenomenon directly related to the large number of freezes and rollbacks.

There continued to be progress by management in eliminating restrictive language for nonwage contract items. Wide variations between regions continued and cost-of-living adjustments, rare in construction contracts, were included in more than 25% of the contracts signed in the two western regions.

About a third of the first-year increase in wages and fringes was offset by negotiated changes in work rules. The average savings were estimated at 56 cents/hour. Many reduced the premium for daily and Saturday overtime from double to 1.5 times the base rate, some allowed Saturday as a make-up day, and others allowed workers at less than the journeyman wage rate (judged the most effective cost cutter).

Construction industry employment bottomed out in March, 1983, at about 3.75 million workers — the lowest level since 1977 — and has been recovering steadily ever since. By year's end, employment had improved by 250,000 jobs but still was no higher than at the end of 1981.

The industry unemployment rate in the past year improved from 20% to 15%, or 4.1 million workers. Compared with other industries, construction wage settlements were about the same. But if the wage concessions in the steel industry are excluded, construction wage settlements were lower than for other industries.

Looking ahead

Prospects for large commercial buildings, utilities, and manufacturing facilities — the main strength of today's unionized construction industry — hold little hope for much growth.

Even with the strong upturn in employment in 1983, construction's share of total jobs in the country remained at 4.4%, its lowest point in recent years. It was 5% in 1979 and 5.3% 10 years ago. There has been a similar decline in construction's share of the gross national product.

Heavy bargaining in 1984 is a consequence of the abnormally high number of one-year agreements negotiated last year. About half of this year's bargaining will involve contracts negotiated last year and about a quarter each will involve contracts negotiated in 1981 and 1982.

CLRC feels that the contracts negotiated prior to 1983 still offer many opportunities for wage and fringe adjustments and changes in work rules to make contractors more competitive.

With almost 70% of the industry's collective bargaining agreements scheduled for renegotiation in 1984, the construction industry will experience the heaviest bargaining since the wage control years of the early 1970's. Scheduled increases for 1984 for the 670 contracts in force average $1.04, or 5.3%. Scheduled increases for 1985 average $1.07, or 5.1%.

However, warns CLRC, these scheduled increases probably will be less of an indicator of 1984 bargaining behavior than in the past because of the fewer number of contracts not up for renewal this year.

Crafts

The average wages-plus-fringes for UA pipefitters in the U.S. on Jan. 1, 1979, was $14.61/hour. By Jan. 1, 1984, that average rate had increased by $7.48/hour, or 51.2%, to $22.09/hour, according to CLRC fig-

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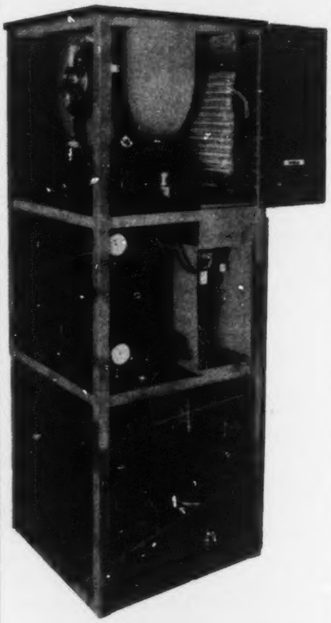

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ures.

The lowest increase was $5.59/hour (to a 1984 rate of $19.04/hour) in the Mountain-Northern Plains region. The highest was $10.69/hour (to $28.44/hour in 1984) in the Southwest Pacific region.

UA plumber locals averaged $14.21/hour on Jan. 1, 1979, and on Jan. 1, 1984, the wages-fringes package had increased by $7.17/hour to $21.90/hour.

The lowest increase was $6.28/hour (to a 1984 rate of $20.81/hour) in the East North Central region. The highest was the $9.19/hour average increase (to $22.90/hour) for plumbers in New England.

Members of the Sheet Metal Workers' International Association averaged $14.21/hour on Jan. 1, 1979. By Jan. 1, 1984, that average wage-fringe package had increased by $6.95/hour to $21.16/hour.

The lowest increase for sheet metal workers was the $4.97/hour for those in the West North Central states which brought them to $18.72/hour by the start of 1984. The biggest increase was the $8.91/hour negotiated by New England locals to produce an average of $22.25/hour for the region at the start of this year.

International

The hard U.S. dollar, which makes U.S. exports more expensive abroad and imports cheaper at home, continued to have a major impact on exports and imports of air conditioning and refrigeration products. Since 1981, the industry's positive trade balance has been eroded by 35%.

The total value of exports, according to the Department of Commerce, was $1,566,057,567 in 1983, or 13% less than the $1.802 billion recorded in the previous year. At the same time, there was a 37% increase in the value of air conditioning and refrigeration equipment imported in the U.S. Imports in 1983 totaled $396,828,372, up from $289.6 million in the previous year.

The difference in scale is readily apparent. Imports still represented only 25.3% of exports, but the gap is closing. Imports represented 16% of exports in 1982 – and 13.2% in 1981.

The positive balance of trade generated by air conditioning and refrigeration equipment amounted to $1.17 billion in 1983, down 22.5% from the $1.51 billion balance in 1982 and down 35% from the $1.8 billion balance in 1981. This represents only shipments and does not take into account the profits to U.S. companies from subsidiaries, joint ventures, and licensing agreements that are not reinvested abroad.

There is nothing on the horizon to suggest that the trend established in 1982 – increased imports, particularly compressors, and declining exports – will not continue in 1984. The U.S. economy has been recovering at a faster pace than most of the rest of the world, U.S. interest rates still are high in comparison with those of other countries, and the minimal weakening of U.S. currency versus the currencies of other major trading nations does not promise to materially change the price disadvantage faced by U.S. exports.

In short, we can look forward to a continuous whittling away of the U.S. positive trade balance.

Canada emerged as the top export market for U.S. air conditioning and refrigeration equipment, at $422 million or 27% of the total, after many years of playing second fiddle to the Middle East. The $361 million in exports to the Middle East, or 23% of the total, reflected the unrest in much of that region. But the Saudi Arabian market, at $243 million in 1983, absorbed 15.5% of all U.S. exports – about the same as for the Far East and nearly as much as Western Europe.

Imports

According to the Department of Commerce, five nations accounted for

$342.8 million of the $396.8 million worth of air conditioning and refrigeration equipment imported into the U.S. last year. The five:

- **$191 million from Japan,** up 43% from 1982, which mostly included 1.5 million automotive air conditioning compressors; 575,000 compressors of less than 0.25 hp; 210,000 compressors of from 0.25 to 10 hp; 13,000 room air conditioners; 1,700 unitary air conditioners; 322 screw compressors; 7,700 refrigerators; 1,100 freezers; $22 million in air conditioner parts; and $51.2 million in automotive air conditioner parts.
- **$55.5 million from Canada,** up 9.3% from 1982, which mostly included 134,730 compressors of less than 0.25 hp; 83,800 room air conditioners; 24,000 unitary air conditioners; 4,700 refrigerators; 24,700 freezers; and $12.8 million in air conditioner parts.
- **$37.9 million from Italy,** up 28.5% from 1982, which mostly included 807,000 compressors of less than 0.25 hp; 197,300 compressors of from 0.25 to 3 hp; 1,000 refrigerators; 39,900 freezers; and 290 screw compressors.
- **$33.4 million from Singapore,** up 61% from 1982, which mostly included 970,000 compressors of less than 0.25 hp; 39,000 compressors of from 0.25 to 1 hp; and 3,900 unitary air conditioners.
- **$25 million from Sweden,** which mostly included 56,500 absorption-type refrigerators.

Of the remainder, the U.S. imported 229,000 compressors of less than 0.25 hp from Brazil, 116,000 compressors of less than 0.25 hp from West Germany (along with 413 screw compressors), and 8,600 freezers from Yugoslavia.

In all, the U.S. imported $194.2 million worth of compressors in 1983, up 42% from the $136.5 million worth the previous year. Of the 4.9 million compressors imported into the U.S. last year, or about 25% of U.S. consumption, 58% (2.84 million) were compressors of less than 0.25 hp and 32.5% (1.59 million units) were automotive air conditioning compressors.

Top markets

In terms of products exported from the U.S., the Department of Commerce's Bureau of the Census prepares country-by-country breakdowns for most of the product categories listed in the 10-year look at industry shipments found elsewhere in this issue. In most instances, it lists the number of units shipped and their total dollar value.

The U.S. was for many years the leading exporter of room air conditioners and, traditionally, sent about 25% of production to foreign markets. It lost that leadership to Japan in 1981 and, last year, exported only 227,200 units, or 11.4% of U.S. production. The 1983 figure also represents a 52.7% decline from the 480,100 room air conditioners exported in 1982.

Although we do not have the space to reprint the complete breakdowns, a feel for the top export markets of 1983 can be gained by looking at the top customer countries for key products expressed in numbers of units. Here are a few:

- **Auto and truck refrigeration and air conditioning compressors** (636,700 units total, up 158% from 1982) Canada 341,500; West Germany 230,800; Brazil 25,700; Mexico 13,200; Saudi Arabia 7,600; and Australia 3,800.
- **Compressors of 3 hp and less** (692,000 units total, up 5% from 1982) Canada 182,200; Japan 93,400; Saudi Arabia 82,100; Thailand 68,300; Mexico 41,800; Hong Kong 29,600; Singapore 22,200; Venezuela 17,400; Nigeria 14,300; and Taiwan 12,900.
- **Compressors of from 3 to 10 hp** (168,550 units total, down 58% from 1982) Canada 61,500; Saudi Arabia 38,400; Thailand 18,300; Australia 9,000; Brazil 3,600; and Japan 3,100.
- **Compressors of more than 10 hp** (29,000 units total, down 25% from 1982) France 3,300; Canada 2,500; Saudi Arabia 1,900; Mexico 2,000; Hong Kong 1,600; Australia 1,800; and Taiwan 1,200.
- **Ammonia compressors** [illegible],740 units total, down 31% from 1982) Canada 871; Guatemala 160; Italy 150; Japan 134; and Mexico 109.
- **Room air conditioners under 10,000 Btuh** (46,800 units total) Saudi Arabia 8,500; Kuwait 3,800; Hong Kong 3,000; Trinidad 2,000; West Germany 1,500; Lebanon 1,400; Portugal 1,400; Korea 1,300; Antilles

TURN TO NEXT PAGE

Major export markets

U.S. air conditioning, refrigeration equipment (values in millions)

Market	— 1979 —		— 1980 —		— 1981 —		— 1982 —		— 1983 —	
	Value	% of total	Value	% of total	Value	% of total	Value	% of total	Value	% of total
Canada	307	19	310	17	401	19	352	19	422	27
Central, South America	242	15	262	14	363	18	285	16	180	12
Western Europe	242	15	320	16	315	15	323	18	277	18
Far East	242	15	289	16	314	15	297	16	242	15
Middle East	404	25	457	25	506	24	445	25	361	23
Africa	81	5	117	6	164	8	98	5	51	3
Other	97	6	108	6	10	1	1	1	33	2
Total	**1,615**	**100**	**1,863**	**100**	**2,073**	**100**	**1,802**	**100**	**1,566**	**100**

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1,100; and South Africa 1,100.

- **Room air conditioners 10,000 to 17,000 Btuh** (70,700 units total) Saudi Arabia 20,000; Hong Kong 9,100; Nigeria 7,300; Arab Emirates 4,000; Taiwan 3,000; Trinidad 2,000; Canada 1,400; Oman 1,300; Bahrain 1,600; Libya 1,300; and Colombia 1,100.
- **Room air conditioners 17,000 Btuh and over** (109,700 units total) Saudi Arabia 55,100; Kuwait 10,000; Hong Kong 8,200; Arab Emirates 6,500; Nigeria 2,800; Canada 2,600; South Africa 1,600; Taiwan 1,500; Trinidad 1,500; and Panama 1,200.
- **Self-contained heat pumps 5 tons and under** (13,400 units total) Canada 6,200; Taiwan 1,100; Mexico 720; Saudi Arabia 700.
- **Self-contained heat pumps over 5 tons** (1,600 units total) Canada 950; Saudi Arabia 180; United Kingdom 170; and Australia 120.
- **Split-system heat pumps** (18,000) units total, down 3.7% from 1982) Canada 8,900; Saudi Arabia 2,100; Australia 970; Spain 600; United Kingdom 600; and Belgium 500.
- **All-year heating-cooling packages under 5 tons** (unit count not available, value $14.4 million) Canada $4.2 million; Saudi Arabia $3.4 million; Hong Kong $670,000; and Mexico $600,000.
- **All-year heating-cooling packages over 5 tons** (unit count not available, value $11.4 million) Saudi Arabia $3.4 million; Canada $2.6 million; United Kingdom $1.3 million; Korea $925,000; and Nigeria $800,000.
- **Self-contained air conditioners 5 tons and under** (25,200 units, down 37% from 1982) Canada 6,200; Saudi Arabia 4,500; Kuwait 1,700; Taiwan 1,200; Hong Kong 1,000; and the United Kingdom 950.
- **Self-contained air conditioners over 5 tons** (17,500 units total, even with 1982) Canada 3,600; Saudi Arabia 3,200; France 1,300; and West Germany 900.
- **Air conditioning condensing units under 5 tons** (60,600 units total, even with 1982) Saudi Arabia 23,200; Canada 6,900; Colombia 4,100; Egypt 3,700; Italy 2,200; United Kingdom 2,100; Arab Emirates 1,500; Kuwait 1,300; and Hong King 1,200.
- **Air conditioning condensing units over 5 tons** (7,150 units total, down 19% from 1982) Saudi Arabia 1,600; Arab Emirates 750; Kuwait 700; and Canada 600.
- **Room fancoil units** (33,400 units total, down 29% from 1982) Saudi Arabia 14,000; Hong Kong 4,200; Canada 2,300; Iraq 2,000; and Arab Emirates 1,500.
- **Central station air handlers** (13,000 units total, up 7.7% from 1982) Saudi Arabia 4,700; Arab Emirates 1,700; Iraq 1,350; Quatar 550; United Kingdom 550; Kuwait 500; and Canada 460.
- **Centrifugal liquid chillers** (908 units total, down 21.5% from 1982) Saudi Arabia 144; Canada 112; France 59; and Taiwan 56.
- **Absorption liquid chillers** (132 units total, up 8.2% from 1982) Turkey 20; Italy 16; Canada 16; and the Netherlands 14.
- **Reciprocating liquid chilling packages** (1,820 units total, down 20.8% from 1982) Saudi Arabia 435; Arab Emirates 194; Canada 151; Malaysia 122; and Taiwan 110.
- Of the $253.5 million worth of **air conditioning and refrigeration parts,** down 12% from 1982, Saudi Arabia accounted for $81 million; France $17.7 million; Canada $16.8 million; Arab Emirates $8.8 million; Mexico $8.1 million; Nigeria $6 million; United Kingdom $5.8 million; Hong Kong $5.8 million; West Germany $5.3 million; Quatar $5.1 million; Australia $4.6 million; and South Africa $4.1 million. It does not include $36 million in compressor parts, $2 million in vitreous enamel parts for refrigerators, $21 million in household refrigerator-freezer parts; and $125.6 million in other refrigeration parts.
- **Ice-making machines** (22,000 units total, down 2.2% from 1982) Canada 7,000; United Kingdom 1,300; Venezuela 1,000; Iran 900; Saudi Arabia 660; Colombia 630; West Germany 400; and Spain 400.
- **Drinking water coolers** (64,600 units total, down 6.4% from 1982) Saudi Arabia 21,500; Canada 20,000; Hong Kong 1,650; Indonesia 1,600; United Kingdom 1,300; Italy 1,200; Kuwait 3,900; and Japan 1,000.
- **Soda fountain and beer-dispensing equipment** (8,600 units total, down 41% from 1982) Canada 1,700; Singapore 900; Hong Kong 900; Saudi Arabia 650; Colombia 600; and West Germany 600.
- **Refrigerated enclosures** (32,000 units total) Canada 5,000; Saudi Arabia 3,850; United Kingdom 2,850; West Germany 2,400; and Japan 2,300.
- **Commercial refrigeration equipment** (15,150 units total) Canada 2,800; West Germany 2,700; Japan 1,400; France 1,300; United Kingdom 1,200; Hong Kong 1,100; and Ireland 900.

Wholesalers

Air conditioning and refrigeration parts-and-supplies wholesalers feel that business in 1984 will move ahead of last year's total volume by 11.5%, according to a forecast by 61 members of the Air-conditioning and Refrigeration Wholesalers (ARW).

Although the forecast varies slightly for the five regions, it marks the first year in the last four that members forecast much real growth. The increase in volume, which runs from 10.1% in the Northeast to 14.7% in the Southwest, is forecast to be at least double the 4.9% anticipated rate of inflation.

Because ARW wholesalers are traditionally oriented toward parts and pieces, their business depends much more on the number of system repairs being made in a given year than on the much more volatile equipment market. For this reason, ARW wholesalers tend to experience flat sales periods rather than declines during recession years. By the same token, sales gains are usually more modest in growth years.

The greatest percentage gain among product categories in 1984 will come from grilles, registers, and diffusers. The anticipated 13.8% national average ranges from even in the Northeast through 6% in the Central region and 12.4% in the Southeast to 17.8% in the Southwest and 25% in the West. For the most part, the forecast reflects the 1.825-million level of new home starts this year.

Unitary air conditioning equipment in capacities of less than 4 tons lived up to its leadership role in 1983 and this year is expected to expand ARW member volume by 11.8%. The biggest increases are predictably expected in the Southwest (17.2%) and West (14.3%). The Central region, however, is expecting a 15.8% increase in unitary business as the economic recovery makes itself felt.

Two replacement items are expected to show solid performances this year. Electric motor sales are expected to increase by 10.7%, and replacement compressors should increase by 10.2%. Again, the biggest concentrations will be in the Southwest and West.

The weakest projected change, at 5.7%, is for water treatment and maintenance chemicals. This category is followed closely by pipe and tubing insulation (6.5%) and by pipe and tubing fittings (at 6.8%).

Canadian sales in 1984 are expected to grow by 9.7%, or nearly double the growth expected a year earlier. The sales increase in Canada will be paced by air filters and air cleaners, at 12.6%, and by replacement compressors, at 12.5%.

The weakest projected changes in Canada are 7.7% drops for both grilles, registers, and diffusers and for sheet metal and fittings. The only other decrease is a 2.5% drop in expected sales of water treatment and maintenance chemicals, a reflection of the market share losses being experienced by water-cooled condensing and hydronic heating. Ten ARW

Each Statistical Panorama includes the latest data available. Sources frequently revise their previous year's figures, which explains apparent discrepancies between the latest and earlier published data. Where sources give significantly varying information, that data is mentioned.

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continued just above the 1980 base period and, this year, should push ahead by about 15% in real terms. In dollar terms, the NHAW forecast calls for a 9.1% increase this year, a 14.1% increase in 1985, and a 12.7% increase in 1986.

Sales of **controls,** despite a dip in the third quarter of last year, promise a steady upward climb from that point through the second quarter of 1985. The sales forecast calls for a 9.9% increase this year, another 12.7% increase in 1985, and a 13.9% increase in 1986.

Sheet metal sales, which also dipped in the third quarter of 1983, also promise a healthy increase this year that should continue on into 1985. The projected sales increase is 20.3% for 1984, 9.3% for 1985, and 7.5% for 1986.

Plumbing sales, which showed an overall increase last year, promise to hold relatively steady at a good level for the foreseeable future. The projected sales increase for 1984 is 10.4%, followed by a 5% increase in 1985 and a 9.1% increase in 1986.

In its introduction, Spooner warned that the growth that came on strongly in 1983 will taper off as the nation and the industry move further into the recovery. Activity in the last quarter of 1984, in real terms, will be about 4.7% above the fourth quarter of 1983.

The dramatic rise in housing starts almost surely will level off, Spooner said, in large measure because the infrastructure has about reached its limit. Too, an expected upturn in nonresidential construction is likely to bring competition for financing and contractor attention.

"Lessons learned during the past three years, and in particular commitments made toward staying lean and flexible, should serve well in 1984," the firm advised.

Each Statistical Panorama includes the latest data available. Sources frequently revise their previous year's figures, which explains apparent discrepancies between the latest and earlier published data. Where sources give significantly varying information, that data is mentioned.

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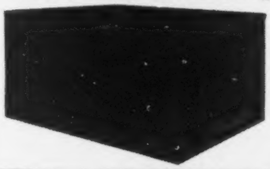

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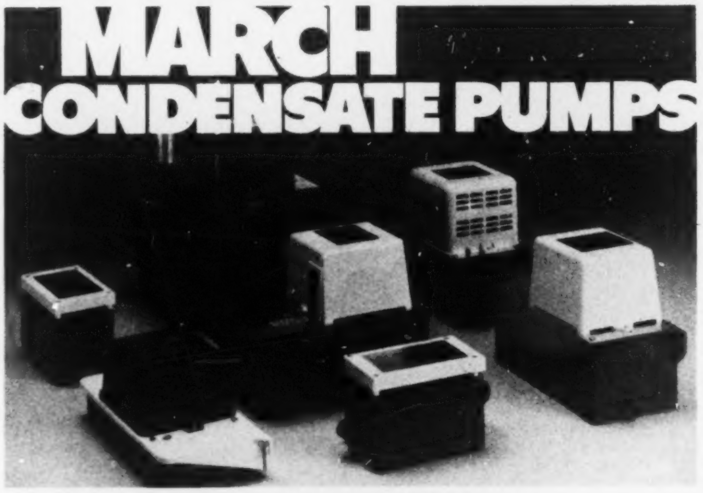

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Bureau of the Census data

A 10-year look at air conditioning and refrigeration unit shipments

Product	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**
Condensing units	501,313	474,771	334,679	417,286	529,515	537,082	497,833	455,695	439,714	381,155
Compressors and compressor units	21,812,788	19,134,563	19,240,243	22,761,950	23,991,643	25,790,862	24,970,111	19,829,319	21,233,348	17,126,939
Ammonia compressors	**1,725**	**1,714**	**1,449**	**1,453**	**1,443**	**1,819**	**2,014**	**1,860**	**1,808**	**1,509**
Screw compressors[1]	—	—	—	—	—	—	—	**5,809**	**5,320**	**2,620**
Fancoil units[2]	265,699	284,267	200,807	193,587	198,939	186,827	178,719	245,127	253,832	210,410
Induction units[3]	48,341	38,422	42,636	21,112	—	—	—	33,343	—	—
Central-station air handlers	**51,260**	**53,621**	**47,691**	**48,616**	**52,371**	**52,441**	**60,266**	**60,841**	**59,866**	**58,385**
Unitary air conditioners[4]	**2,726,269**	**2,392,193**	**1,561,385**	**2,399,638**	**2,829,447**	**3,226,998**	**3,057,009**	**1,881,465**	**1,991,507**	**1,555,093**
Unitary heat pumps (air-to-air)	104,267	119,983	160,485	320,043	536,558	371,436	646,926	508,457	604,903	410,794
Water-source heat pumps	—	—	—	—	—	—	—	69,931	69,689	63,153
Packaged terminal air conditioners	**294,198**	**268,253**	**189,927**	**182,608**	**261,777**	**148,332**	**183,274**	**143,212**	**143,427**	**135,741**
Packaged terminal heat pumps[1]	—	—	—	—	—	—	—	—	**32,439**	**52,512**
Room air conditioners	4,937,384	4,244,586	2,648,430	2,805,124	3,303,335	4,030,423	3,757,102	3,178,993	3,722,509	2,880,830
Centrifugal chillers[5]	3,875	4,496	4,647	2,994	2,977	2,975	3,141	4,200	3,938	3,603
Reciprocating chillers	**10,126**	**11,130**	**9,279**	**7,114**	**8,665**	**9,003**	**9,695**	**12,325**	**12,090**	**11,404**
Absorption chillers	**2,222**	**1,087**	**740**	**571**	**588**	**470**	**392**	**279**	**239**	**199**
Adsorption, open-type absorption	Combined	—	1,672	1,866	2,318	2,704	2,503	2,962	3,171	3,797
Cooling towers[2]	14,733	13,950	13,212	11,156	8,517	9,906	—	12,185	15,381	11,222
Evaporative condensers	**3,276**	**3,112**	**2,764**	**2,094**	**2,299**	**2,453**	**3,263**	**2,881**	**2,859**	**2,693**
Mobile vehicle air conditioners	**6,462,307**	**6,891,353**	**9,137,453**	**11,978,679**	**9,459,535**	**9,074,932**	**7,651,198**	**5,852,328**	**6,059,342**	**5,661,179**
Mobile air conditioners for trucks, agricultural, construction equipment	577,361	905,993	1,412,508	2,320,911	2,452,820	1,298,198	1,352,196	764,942	834,174	1,062,263
Mobile vehicle refrigeration systems[6]	68,992	67,494	63,864	70,836	76,536	70,731	76,395	60,301	66,773	67,788
Recreational vehicle air conditioners[1]	—	—	—	—	—	—	—	**93,919**	**119,566**	**142,164**
Unit coolers[7]	**192,766**	**186,312**	**161,287**	**195,738**	**197,975**	**194,905**	**187,434**	**175,371**	**169,487**	**163,697**
Ice-making machines	121,245	124,075	128,288	187,887	165,106	194,049	218,827	166,725	165,626	148,609
Drinking water coolers	384,745	373,723	262,173	307,570	335,173	373,885	411,687	409,782	432,733	355,426
Dehumidifiers	**730,427**	**645,287**	**525,407**	**502,141**	**351,188**	**477,692**	**728,148**	**734,738**	**540,386**	**408,956**
Humidifiers (central and self-contained)[1]	—	—	—	—	—	—	—	**423,986**	**396,413**	**305,753**

Source: Bureau of the Census Current Industrial Reports MA-35M, Air-Conditioning and Refrigeration Equipment, including Warm Air Furnaces. [1]New category. [2]Excludes vertical stack units for 1977. [3]Withheld to avoid disclosing operations of individual companies. [4]For years 1980 through 1982, add these figures to those for unitary heat pumps (air-to-air) and subtract exports to get comparable industry figures. [5]Excludes open-type units for 1978 and succeeding years. [6]Excludes railway freight cars for 1974 and succeeding years. [7]Excludes floor-mounted dry and spray types for 1979 and succeeding years.

Percent of dollar value potential for 1984 vs 1983

	Northeast	Southeast	Central	Southwest	West	Total	Canada
Unitary AC&H equipment (4 tons and under)	8.3	6.9	15.8	17.2	14.3	11.8	1.8
Unitary AC&H equipment (over 4 tons)	5.8	3.5	13.3	11.4	9.4	8.0	1.5
Refrigeration condensing units	8.2	6.8	7.7	7.6	9.8	7.5	7.1
Refrigeration coils	8.0	6.8	8.7	8.7	11.7	8.7	6.8
Replacement compressors	7.7	7.4	9.1	13.9	14.6	10.2	12.5
Refrigerant	7.2	6.7	8.8	14.3	7.7	8.8	4.3
Driers, strainers, filters, and sight glasses	6.8	9.5	8.9	18.1	5.9	10.2	8.5
Refrigerant flow controls – TEV, solenoid, regulating valves, etc.	6.8	7.4	7.8	16.8	5.9	9.1	9.3
Pressure and temperature controls	6.5	7.2	8.0	15.3	8.4	9.3	9.0
Electrical controls – relays, contactors and starters	6.4	9.3	8.9	10.2	8.8	9.2	9.4
Capacitors	4.4	8.8	8.2	9.9	11.4	8.9	5.7
Electric motors	5.3	9.6	9.6	14.8	12.2	10.7	4.8
Pipe and tubing fittings	4.8	6.4	6.7	11.3	3.1	6.8	6.5
Pipe and tubing insulation	4.1	6.3	6.6	10.7	3.1	6.5	6.2
Grilles, registers, and diffusers	—	12.4	6.0	17.8	25.0	13.8	–7.7
Sheet metal and fittings	—	3.8	7.1	15.4	NA	8.6	–7.7
Air filters and air cleaners	4.2	8.3	7.7	10.9	8.2	8.3	12.6
Water treatment and maintenance chemicals	–.1	5.8	5.2	5.4	9.6	5.7	–2.5
Instruments and test equipment	2.9	5.1	8.5	13.6	10.5	8.4	7.0
Totals	**10.1**	**10.2**	**10.6**	**14.7**	**12.7**	**11.5**	**9.7**

1984 SALES FORECAST undertaken by members of the Air-conditioning and Refrigeration Wholesalers (ARW) shows an overall gain of 11.5% in dollar volume over 1983. While a total of 61 firms submitted data for the 1984 forecast, not all indicated their region. Therefore, percentages shown in the "U.S. Total" column do not equal the average of all region data combined. Rather, the "U.S. Total" column represents the average of all respondents, including those who did not indicate their region.

The replacement market

Even though the surge in new home construction managed to steal most of the headlines, the replacement markets for comfort cooling, heat pumps, boilers, and furnaces continued strong throughout 1983 and promise continued advances this year.

The big news in the replacement market was brought about by advances in gas furnace technology that, in the space of little more than two years, have created a new quarter-million-unit market based on replacing sound furnaces for reasons of efficiency.

Although our formulas produced only minimal increases in the replacement markets for residential comfort cooling and heat pump equipment, we suspect that a major change in inventory levels may have clouded the picture. If we're right, replacement sales could be much better than represented.

Another distortion, if percentage of total shipments is used as a criterion, was caused last year by the 60% increase in new home starts. For example, the replacement performance and outlook for both boilers and oil furnaces is good despite drops in replacement percentages.

The most dramatic example is related to gas furnaces. Although the number of replacements dropped from 62% of total shipments in 1982 to 58% last year, the replacement market expressed in units increased by nearly 250,000 to 960,000 units.

Air conditioning

In the case of unitary air conditioning, the replacement market must be separated into three parts — home comfort cooling, heat pumps, and commercial.

If we subtract 629,776 heat pumps from the 2,668,321 unitary shipment total for 1983, we get 2,038,545 comfort cooling units — of which 77%, or 1,569,680 units, were residential and 23% or 468,865 units, were commercial. This split was selected because it matched the determination of the Air-Conditioning and Refrigeration Institute (ARI) for 1979, when total shipments were close to the 1983 experience.

Of the 1,569,680 residential cooling units shipped in 1983, we estimate that 55.8%, or 875,380 units, went into new construction (442,764 into single-family homes, 432,616 into multifamily homes). This figure was arrived at multiplying known penetration rates for air conditioning by a known number of housing starts and subtracting the number of heat pumps.

Looking back at the 414,800 comfort cooling units we estimated were installed in new homes in 1982, the 1983 figure represents a 109% increase in a single year. The reason, of course, was the dramatic 60% increase in new home starts and increased penetration rates for both comfort cooling and heat pumps. New residential construction accounted for only 36.7% of residential comfort cooling shipments in 1982. A year later, however, that portion jumped to 55.8%.

The other residential comfort cooling units break down this way: 404,300 units, or 26%, were replacements; 235,000 units, or 15%, were add-on units; 40,000 units, or 2.5%, were new mobile home units; and 15,000, or 1%, were mobile home replacements.

It would appear that replacement sales should have been higher than this exercise reveals given the driving forces of utility rebates for high-efficiency replacements, a relatively hot summer in 1983, and the fact that many replacements were postponed until last summer because of the uncertainty associated with the recession economy of the previous two years.

We feel this distortion can be accounted for by the 214,000-unit drop in inventory levels, almost all of which probably was in residential air conditioners and heat pumps. If, say, 60% of that number was applied to residential replacements, the total would be much more impressive. We'll have to wait until the 1984 figures are in to see if we are on the right track.

Such a judgement would also have a dramatic effect on the estimated 440,375 replacement residential cooling units we expect to be installed this year. An extra 130,000 replacement units this year would bring the proportion to 34% of residential comfort cooling shipments of 1,675,000 units, a figure that is more in line with what appears to be happening in the field.

Of the estimated 468,865 commercial cooling units shipped last year, we estimate that two-thirds, or 309,451 units, went into new construction and one third, or 159,414, were replacement units.

But of the 62,977 commercial heat pumps we estimate were shipped in 1983, nine out of 10, or 56,679 units, went into new construction and only 10%, or 6,298 units, were replacements.

In 1984, we estimate that 170,000 of the 500,000 commercial cooling units, or 34%, will be replacements and that 6,750 commercial heat pumps, or 10% of the 67,500 total, will be replacements.

In the case of residential heat pumps, the sharp increase in new home starts combined with increased penetration into new single-family homes produced a 48% increase in residential heat pump shipments into this market sector, from 295,700 in 1982 to 437,669 last year. A more modest 7.7% increase to 471, 375 heat pumps is expected this year.

Of the remaining residential heat pumps, we estimate that 99,500 were replacements, 20,000 were add-on units, and 9,700 were new and replacement mobile home units.

Again we are faced with a replacement figure that appears to be a bit low, especially in view of the fact that much more efficient units now are available to residents of the Deep South where heat pumps have been a fact of life for decades.

A complicating factor, too, is the unknown number of add-on heat pumps that are replacing split-system air conditioners on oil-, gas-, and LP-fired furnaces in order to reap higher efficiencies during mild weather. We have estimated the number at 20,000 units but it could be double that.

Going back to the surplus inventory figure, 40% of that would be 85,600 units. But again, we'll have to await the 1984 shipment figures to get a clearer picture.

Add-ons

The add-on market for residential comfort cooling, which once led replacements by a wide margin, was estimated at about 29% of the market as late as 1981 and slipped to 24% in 1982 and to 15% in 1983.

In prior years, the number of add-on units tended to increase in years with few housing starts as people opted to fix up their present homes rather than buy new ones. But high interest rates, high unemployment, and an uncertain economy in 1981 and 1982 combined to keep add-on as well as new construction sales depressed.

Percentages, too, can be deceiving. In years when new construction levels are low, such as 1981 and 1982, the percentage of add-on units is higher than in years, like 1983, when new home construction is up, yet the total numbers stay much the same.

Although the number of homes with central cooling grows with each passing year, and so reducing the market potential for add-on units, we feel there will be a base add-on market of about 250,000 units annually for the foreseeable future. The market is at that point now.

While it's true that the add-on market potential continues to shrink in one direction, it's also true that a growing number of people without central cooling are electing to replace inefficient furnaces with high-efficiency models. Once prompted, it would appear reasonable that at least some of these people will be persuaded to add central cooling, or a heat pump, at the same time, especially since the contractor offers both heating and cooling products.

It's a reversal of a past phenomenon whereby many homeowners were influenced to buy a new furnace when they added central cooling.

Boilers

Of the 230,165 residential boilers shipped in 1983, only 39,500 went into new single-family homes and, when multifamily units are taken into account, that number probably approaches 45,000 units. The rest, about 80%, were replacements.

It might be noted that the gas conversion phenomenon, which caused large increases in residential gas boiler shipments for two years, is over and today's market is on a more normal footing.

We feel that residential boiler replacements will increase by about 10% this year, from 185,000 in 1983 to 203,500 units. The overall 8% increase in residential boiler shipments forecast for 1984 reflects a slight decline in the new construction market because of shrinking market share.

Furnaces

Of the 104,300 residential oil furnaces shipped last year, 23,500 went into new single-family homes. Somewhere close to 1,000 oil furnaces went into multifamily buildings. This means that 79,800 furnaces, or 76.5%, were replacements.

In the previous year, when new home construction was at a low ebb, we estimated that 14,000 of the 103,500 oil furnaces shipped in 1982 went into new and multifamily homes. The remaining 89,500 units, or 86.5%, were replacements.

This means that replacement oil furnace sales last year dropped by nearly 10,000 units, or 10.8%, while contractor attention was diverted to the new home market. The 8% increase in oil furnace shipments forecast for 1984 should more than make up this deficit.

Not to be forgotten, too, are the 461,291 replacement oil burners shipped in 1983. Fuel Oil/Oil Heat and Solar Systems magazine estimated that 80% of these burners were retention-head or other high-efficiency types.

Of the 1,661,765 residential gas furnaces shipped in 1983, we estimate that 650,000 went into new single- and multifamily homes, 50,000 were conversions from other fuels, and 960,000, or 58%, were replacements.

For comparison, 380,000 of the 1,155,200 gas furnaces shipped in 1982 went into new single- and multifamily homes, 60,000 were replacements, and the remaining 715,200 furnaces or 62%, were replacements.

Even though the replacement percentage dropped by four points because of the much larger number of new homes started last year, the number of replacements increased by 34%, or nearly a quarter-million units.

If gas furnace shipments in 1984 hold to projections, we forecast that replacement sales this year will increase by 12% to 1,075,000 units, or 59% of shipments.

Although more than half of gas furnace shipments have gone into the replacement market for many years, a new market has evolved in the past couple of years — the replacement of sound furnaces for reasons of efficiency — which promises to become more and more significant with each passing year.

The reason is the revolution in gas furnace design after 30 years in which virtually all gas furnaces were atmospheric types with a standing pilot. Within a five-year span, the standard atmospheric furnace (with a seasonal efficiency of about 60%) was upgraded to include electronic ignition (which raised seasonal efficiencies to the 67% to 71% range) and electronic ignition plus a vent damper (which raised seasonal efficiencies to the 71% to 80% range).

Another class of furnace, most with induced draft, produces seasonal efficiencies in the 80% to 86% range and yet another class, all of which are condensing types, produce seasonal efficiencies in the 86% to 96% range.

All of these options, of course, have increasingly high price tags as the efficiencies increase. But rapidly escalating natural gas prices, plus the fear of more price increases to come, have influenced many homeowners to replace healthy but inefficient gas furnaces with furnaces boasting much higher efficiencies.

The News estimates that, in 1983, this market alone accounted for about 250,000 gas furnace shipments, or about 15% of the total — a remarkable record after little more than two years. This year, that number could grow to 365,000 furnaces, or 20% of total shipments.

Importantly, within a year virtually all manufacturers will be offering high-efficiency choices through the 86% efficiency range and most will be offering ultra high-efficiency condensing-type units.

This new replacement-for-efficiency market already has dwarfed the once-large conversion market, which we feel is holding steady at about 50,000 units annually.

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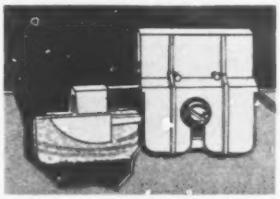

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Our unofficial estimates of unitary market shares

When it comes to figuring the shares of the unitary air conditioning market held by individual manufacturers, we must rely on "feel" rather than reliable numbers. There are no reliable numbers.

Each year, too, the percentages shift a bit as companies enter or leave the market, one company is acquired by another, or distribution-product-promotion improvements are reflected in the marketplace.

And like all national figures, they don't give a clear picture of market shares in any specific city or area of the country. In fact, some of the essentially regional manufacturers, with a small national share of the market, often are among the leaders in those areas where their distribution is concentrated.

Another distortion comes from the interest of the reader. Whether a particular manufacturer is strong in the new-home or the add-on market makes little difference to many. But to a contractor who specializes, the list of competitive brands can expand or contract according to his interests — and change when his emphasis changes.

Because of these and other situations within their own cities, contractors often get a distorted view of national market shares. For them, and for researchers and others not deeply involved in the air conditioning industry, The News offers these educated guesses of unitary equipment market shares in units:

Carrier (including Bryant, Day & Night, Payne) – 24%.

Lennox – 13%.

Rheem-Ruud – 13%

Trane – 13%

Whirlpool, Heil-Quaker – 8%

York (including Borg-Warner Environmental Systems) – 6%.

Snyder General (including Arco) – 4%.

Magic Chef (Johnson, Air Ease, Williams, Armstrong, Gaffers & Sattler), and Heat Controller – 2% each.

Fuels and energy

United States energy consumption for the first 11 months of 1983 was 63.576 quadrillion Btu (quads), about 1.8% less than the 64.75 quads consumed in the same 11-month period a year earlier, and 5.2% less than the 67.058 quads consumed in the first 11 months of 1981.

DOE's Energy Information Administration (EIA), which reports these data, changed its reporting method in the past year and is running nearly two months behind past performance. It's no longer possible to provide full calendar year statistics for the previous year in all categories.

The total energy consumed in the U.S. in 1982 was almost 5% below the consumption level of 1973, the year of the Arab oil embargo. Figures for the first 11 months of 1983 indicate that this trend is continuing.

In the residential and commercial sector, the 22.569 quads consumed in the first 11 months of 1983 was 2.4% less than the 23.12 quads consumed during the first 11 months of 1982. The decrease offset a 2.3% increase during the first 11 months of 1982 over consumption during the first 11 months of the previous year. The 1982 full-year total of 25.606 quads represents a 5.9% increase over the 24.179 quads used by the residential and commercial sector in 1973.

In 1983, this sector represented a 35.5% share of total energy consumption, down from 37.05% in 1982, and the same share as in 1981.

Industrial sector consumption of 23.576 quads for the first 11 months of 1983 was 2% less than 24.059

quads consumed by the industrial sector during the first 11 months of 1982. The 26.272 quads used in 1982 was 17.5% less than the 31.846 quads consumed by this sector in 1973. It represented 37% of the total energy consumed by the nation during the first 11 months of last year, almost the same as the 36.56% share in 1982.

Consumption in the transportation sector during the first 11 months of 1983 totaled 17.333 quads, down 1% from the 17.507 quads consumed by that sector during the same period in 1982. The transportation sector in 1982 consumed 19.105 quads, or 2.8% more than the 18.577 quads consumed in 1973. It represented a 27.3% share of total consumption in 1983, almost the same as the 26.28% share in the previous year.

Electric utilities consumed an estimated 22.541 quads of energy during the first 11 months of 1983, up 1.8% from the 22.145 quads consumed during the same period a year earlier. The 1982 total of 24.151 quads was greater than the 19.852 quads consumed by electric utilities in 1973.

Of utility energy consumed in 1982, the last year for which complete figures are available, coal accounted for 52%, natural gas 13.7%, petroleum 7.4%, hydroelectric 14%, nuclear 12.3%, and other sources 0.45%. Petroleum had an 18.3% share in 1973, and coal accounted for 43.3% in that year.

Of the 25.606 quads used in 1982 in the residential and commerical sector, 0.8% was coal, 29% was natural gas, 9.7% was petroleum, 17.8% was electricity sales, and 42.7% was represented as electrical generation and transmission losses.

Similarly, the 26.272 quads used by the industrial sector in 1982 broke down this way: coal 10%, natural gas 27%, petroleum 30%, electricity sales 9.7% hydroelectric 0.13%, and 23.1% was represented as electrical generation and transmission losses.

Conservation

In order to get a gross measure of conservation, DOE records show that it took 59,500 Btu to generate each constant dollar of gross national product (GNP) in 1973. In the third quarter of 1983, it took only 46,400 Btu to generate a constant dollar of GNP, or 22% less than in 1973.

In simple terms, this means the U.S. economy in the third quarter of last year produced at the rate of 1.553 trillion constant 1972 dollars worth of total goods and services with 22% greater energy efficiency than in 1973. Had it not been for this improvement in efficiency over the past decade, total U.S. energy consumption would have amounted to an annual rate of 87.96 quads in the third quarter of last year instead of the actual 72.103 quads.

Significantly, the consumption of petroleum and natural gas — at 45,700 Btu per constant GNP dollar in 1973 — has declined by 32.6% to 30,800 Btu per constant GNP dollar in the third quarter of 1983. This trend is in contrast to what has been happening to all other forms of energy, which increased by 13% from 13,800 Btu per constant GNP dollar in 1973 to 15,600 Btu per constant GNP dollar in the third quarter of 1983.

Fuel costs

A two-year tally of fuel prices compiled by the Department of Labor as part of the cost-of-living index shows that, from December, 1982, to December, 1983, the price of No. 2 fuel oil dropped 11.7% from $1.229/gal to $1.085/gal. In January, however, fuel oil prices increased to $1.122/gal, or 3.4%.

In December, 1983, the price of No. 2 fuel oil ranged from $1.065/gal in the North Central states to $1.10/gal in the West. But by January, oil prices had climbed to $1.135/gal in the Northeast and $1.123/gal in the South but only to $1.077/gal in the North Central states.

Natural gas prices increased by 5.7% from $59.156 per 100 therms in December, 1982, to $62.541 per 100 therms in December, 1983 — a sharp contrast to the 27.5% national average increase in the previous 12-month period. In January, the price of natural gas declined by 1.6% to $61.562 per 100 therms.

Regionally, the average price of natural gas in December, 1983, ranged from $53.385 per 100 therms in the West to $73.111 per 100 therms in the Northeast. If we exclude Honolulu (at $152.20/100 therms), principal city prices ranged from $47.17 per 100 therms in San Francisco to $79.756 per 100 therms in New York.

At the same time, the cost of 500 kWh of electricity increased by 3% from $37.074 in December, 1982, to $38.188 in December, 1983. Electricity prices ranged from $32.706/500 kWh in the West to $47.643/500 kWh in the Northeast. Among the principal cities, the range went from $19.813/500 kWh in Portland, Ore., and $21.337/500 kWh in Seattle, Wash., to $60.442/500 kWh in New York and $61.856/500 kWh in San Diego, Calif.

EIA has developed new natural gas price information expressed in dollars per 1,000 cu ft. An initial comparison shows that, under the old method, natural gas prices increased from an average of $1.08/1,000 cu ft in 1973 to $5.53/1,000 cu ft in 1982, or an increase of 412%. Under the new method, the price increased by 300% during the same period from $1.29/1,000 cu ft in 1973 to $5.17/1,000 cu ft in 1982. The average price in December, 1983, when calculated by the old method, was $6.42/1,000 cu ft and, by the new method, $6.03/1,000 cu ft.

Residential energy prices expressed in terms of constant 1972 dollars, or without considering inflation, present a much different picture.

For example, the average cost of residential heating oil in 1974, the first year for which figures are available, was $2.12/million Btu. By 1982, the cost has escalated to $3.71/million Btu in real terms, up 75% from 1974 and down 7.5% from the $4.01/million Btu average in 1981. Figures for 1983 are not yet available.

Similarly, the cost of residential natural gas escalated by 111% in real terms from $1.19/million Btu in 1973 to $2.51/million Btu in the third quarter of 1983. The 1983 figure also represented a 13.6% increase over the $2.21/million Btu average for the third quarter of 1982.

The cost of residential electricity escalated only 31.4% in real terms from $7/million Btu in 1973 to $9.20/million Btu in the third quarter of 1983. The 1983 figure represented a 1.9% increase over the $9.03/million Btu average for the third quarter of 1982.

Electricity

Electricity output for the 12 months ending Sept. 30, 1983, at 2.263 trillion kWh, was virtually identical to the output of the previous 12-month period. In actual fact, the previous 1981-1982 period output was 0.122 kWh more.

This is only the third time in modern history that electricity generation

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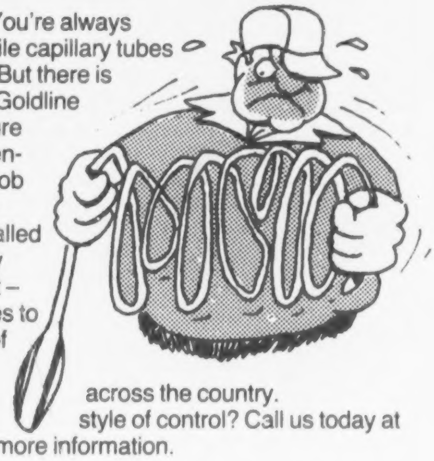

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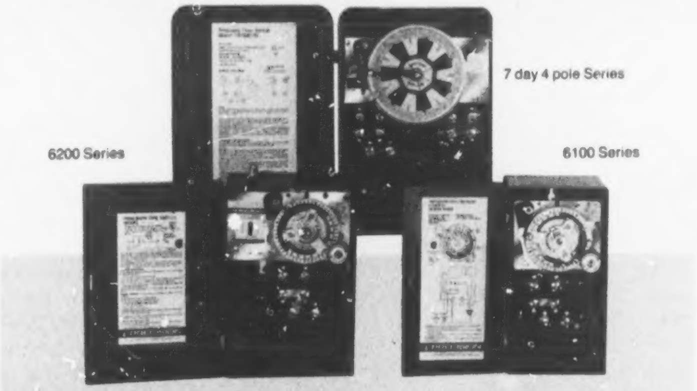

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Fuels and energy

FROM PRECEDING PAGE

has declined. The first time was an 0.3% decrease in 1974, the year following the Arab oil embargo, and the second was a 1.3% decline in the 12-month period ending Sept. 30, 1982.

Total kWh sales in the 12-month period ending Sept. 30, 1983, increased by 1.2% to 2,132,433 million kWh from 2,107,280 million kWh in the previous 12-month period.

Comparing the same periods, commercial sales at 525,889 million kWh in 1983 were up 2% from 515,478 million kWh in 1982. Residential sales, at 745,637 million kWh in 1983, were up 2.2% from 729,835 million kWh in 1982. And industrial sales, at 783,085 million kWh in 1983, were up only 0.13% from the 782,087 million kWh in 1982.

Installed capacity in all 50 states at the end of the third quarter of 1983 was 657,525 thousand kW, a 2.4% increase over the installed capacity of 642.037 thousand kW at the same time in 1982. The average number of customers increased by 1.4% during the same 12-month period, from 94,937,000 in 1982 to 96,233,000 in 1983.

In its short-term energy outlook, EIA forecast that the recovery of the economy should produce a 3.6% increase in electric power generation in 1984. It also forecast a 4% increase in total energy consumption.

As an aside, EIA said petroleum consumption would increase by 0.5%, and total imports by 1.3%, or a collective total of 180,000 barrels of oil/day for each $1/barrel decline in the price of imported crude.

Similarly, each 10% increase in heating degree days during the first and fourth quarters of 1984 would increase petroleum consumption by 1.2% and imports by 1.3%, or a collective total of 190,000 barrels/day. For each 15% increase in cooling degree days during the second and third quarters of 1984, petroleum consumption would increase by 0.3% and imports by 0.6%, or a collective total of 140,000 barrels/day, because of increased utility demand for residual fuel oil.

Nuclear

During November, 1983, U.S. nuclear power plants generated a total of 24.9 billion net kWh of electricity, equivalent to an average hourly output of 34.6 million net kWh. This was 7.3% above the comparable output for November, 1982.

Nuclear power suplied 13.6% of the electricity generated by domestic utilities in November, 1983 — or third behind coal and hydroelectric. The comparable number for November, 1982, was 13.4%. Top nuclear production was the 14.1% share recorded in September, 1982.

As of Nov. 30, 1983, there were 81 licensed U.S. power reactors with a total capacity of 64.1 thousand net megawatts electric (MWe), up from 79 licensed reactors and 61.5 thousand net MWe at the same time in 1982.

Of the 81 licensed units in 1983, one was in low-power testing, four were in power ascension, and 24 generated no electricity or were operated substantially below capacity.

With the withdrawal in November, 1983, of the two nuclear plants planned by Puget Sound Power and Light Co. and partner utilities, the number of units with construction permits pending was reduced to zero. The number of domestic nuclear plants in all stages of planning, construction, or operation as of Nov. 30, 1983, was 139 with an aggregate design capacity of 131,000 net MWe.

There have been no new reactor units announced since 1978. In addition to the 81 licensed power reactors in November, 1983, construction permits have been granted for another 56 units and two plants have reactor units on order.

In a study conducted by EIA, U.S. nuclear capacity is expected to increase to 80.1 thousand net MWe by the end of 1985 and to 114 thousand net MWe by the end of 1990. The number of units is expected to increase from 81 in 1983 to 125 in 1990 and nuclear generation of electricity is expected to more than double the 283 terawatthours (TWh) generated in 1982 to 595 TWh in 1990. Nuclear's share of electricity generation should increase to 19% in 1990 and to 25% by 2010.

The study, published in late 1983, takes into account the lower demand for electricity, utility financial constraints, construction cost escalation and delays, and new regulations that added $24 million to $83 million per reactor in safety-related retrofits as a result of the Three Mile Island accident.

In a speech to the U.S. National Committee of the World Energy Conference, Energy Secretary Donald Hodel said the national energy policy submitted to Congress by President Reagan in October, 1983, set a goal of an adequate supply of energy at a reasonable price — or the ability to withstand import interruptions without tremendous adverse impacts on the economy or national capabilities.

Strategies include minimizing federal control and involvement in energy markets while maintaining public health, safety, and environmental quality, and promoting a balanced and mixed energy resource system. This includes decontrolling the price of natural gas, keeping oil imports to a minimum, building the strategic petroleum reserves, and supporting the nuclear power industry.

Although the decision to build a nuclear power plant will remain with the utilities, Hodel said recently introduced nuclear regulatory reform

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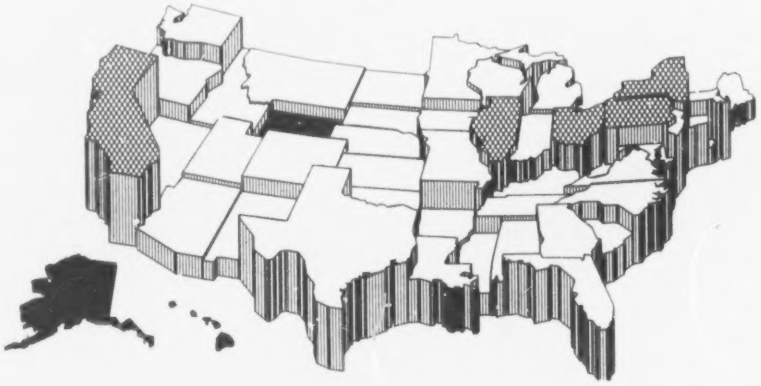
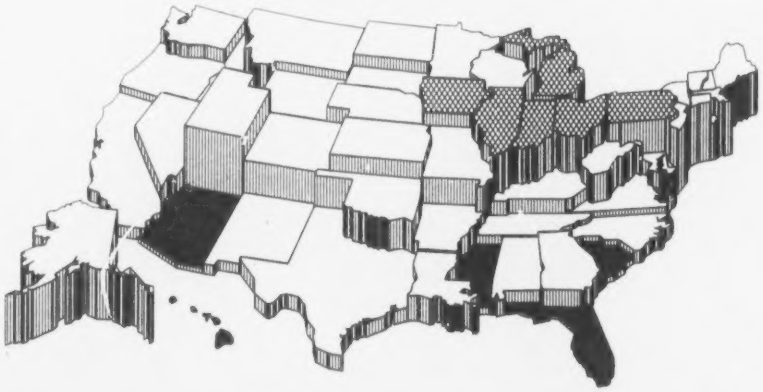
Residential energy consumption

Total



Per capita



EACH PRISM MAP has been scaled by the Energy Information Administration so that the lowest variable value is represented as having no elevation and the highest as having the maximum elevation so that regional patterns stand out in relief. Those with the highest values are cross-hatched and those with the lowest values are darkly shaded. The maps reflect 1981 data.

FROM PRECEDING PAGE

legislation would improve safety and knock five years off the present 12- to 14-year lead times now required for nuclear power plants and bring construction more in line with the six- to seven-year lead times now common outside the U.S.

Additionally, he pointed to the Nuclear Waste Policy Act of 1982, support for an extension of the Price-Anderson Act beyond 1987, and a new uranium enrichment contract proposal to make that process competitive with European consortiums as further proof of the administration's desire to support the nuclear industry.

"The bottom line is that this administration fully supports nuclear power as an imperative, not an option, for assuring a reliable and adequate electricity supply in the United States and the rest of the world," he said.

Outside of the U.S. and the Communist bloc countries, there were 157 nuclear reactors in operation at the end of 1982 with a total capacity of 83,905 net MWe. In addition, there are 137 more reactors under construction with a total capacity of 123,756 net MWe.

Of these 28 countries, France has made a national commitment to nuclear technology and has been ordering reactors at a rate of five per year since 1974. Also, it has developed a modular approach that telescopes construction time to less than six years and, in 1984, expects to bring its second breeder reactor on line.

Natural gas

Gas utility thermal equivalent sales totaled 13,082.2 trillion Btu in 1983, down 8.4% from the 14,280.5 trillion Btu sold in the previous year, according to the American Gas Association (AGA).

The decrease came despite the coldest December on record for much of the nation, which increased gas sales by 9.8% and heating degree days by 44.3% over the previous year's experience. In the November-December portion of this past heating season, however, heating degree days increased by 23.9%, but gas sales increased by only 2.6% over the same two-month period a year earlier.

Industrial sales, which represent 47% of the total, declined by 11% from 6,891.6 trillion Btu in 1982 to 6,134.4 trillion Btu last year. Residential sales, which represent 34.2% of the total, dropped by 6.1% from 4,770 trillion Btu in 1982 to 4,479.5 trillion Btu in 1983. Commercial sales, which represent 17.7% of the total, declined by 6.2% from 2,471.3 trillion Btu in 1982 to 2,319.2 trillion Btu last year. The remaining 149.1 trillion Btu, or 1.1%, was for other uses in 1983.

AGA reported that average natural gas utility prices, expressed in dollars per million Btu, for 1973 were: all $0.79; residential $1.25; commercial $0.95; and industrial $0.50. In 1982, the prices were: all $4.44; residential $4.97; commercial $4.72; and industrial $3.97. Preliminary figures for the third quarter of 1983 showed: all $4.80, up 8.1% from 1982; residential $6.81, up 37%; commercial $5.47, up 15.9%; and industrial $4.18, up 5.3%.

Although upheaval may be too strong a word, the natural gas industry now is in transition from a period before 1978 when federal controls of wellhead prices of interstate gas kept prices well below market value and discouraged drilling to the point where reserves declined seriously and limited production forced curtailments.

The Natural Gas Policy Act of 1978 called for stepped increases in wellhead prices through Jan. 1, 1985, when "new" gas would be decontrolled. But neither the federal government or the gas industry reckoned with the drop in demand caused by a deep recession and energy conservation, or the drop in world oil prices that left a potential 60% of natural gas sales vulnerable to lower-priced residual fuel oil in industrial and utility markets.

The combination of built-in price increases in natural gas supply contracts, negotiated at a time when it was unthinkable that federal control limits would exceed energy market prices, and falling demand resulted in a paradox of decreasing gas demand accompanied by rising prices.

AGA reported in February that, over the past two years, gas companies have taken a number of steps to both reduce the price of natural gas and to stimulate demand, particularly in the industrial sector.

These actions include invocation of market-out clauses which have reduced the prices of some high-priced categories from $7 to $10/million Btu to $2.80 to $4/million Btu, a reduction in the share of high-priced gas where permitted, the invoking of "force majeure" (where one of the parties to a contract defaults because they had no control over the condition that led to the default), and the initiation of sales incentives to retain industrial loads and to stimulate new sales among customers with multifuel capability. A number of these 175 actions by 35 gas companies now are before the courts.

Complicating factors have been the unusually warm 1982-1983 heating season (and little improvement this year), and the steep increase in the average wellhead price of gas from $0.18/1,000 cu ft in 1971 to nearly $2.60/1,000 cu ft in 1983. A 1981 AGA analysis indicated that purchased gas prices accounted for 60% of the retail price of natural gas in that year compared to only 32% in 1971.

Reserves

Prior to the passage of legislation in 1978, federal controls held the price of natural gas well below the cost of competitive fuels. These low prices did not provide adequate incentives for new drilling and, as a consequence, gas reserves in the lower 48 states declined from 270 trillion cu ft (Tcf) in 1969 to 163 Tcf in 1979, a 40% decline.

The higher prices worked and drilling was at an all-time high in 1982. By the end of 1982, proved reserves had climbed to 201.5 Tcf. World reserves of natural gas in 1982 totaled 3,222 Tcf, of which nearly half is in Eastern Europe.

Exploration

Oil and gas wells drilled in 1983 totaled 76,300, a decrease of 11% from the record 85,800 wells drilled in 1982. The total footage drilled in 1983, at 325,669 ft, was 17.8% less than the 396,017 ft drilled in the previous year.

Oil well completions during 1983 totaled 37,204, a 7.7% decline from the 40,298 wells completed in the previous year. Gas well completions during 1983 totaled 15,599, down 17.7% from the 18,953 gas wells completed in 1982.

In 1983 there were 2,232 rotary rigs in operation, down 28% from the 3,105 rotary rigs in operation in 1982. Also in 1983, the 473 seismic crews engaged in exploration were 19.5%

less than the 588 crews operating in the previous year.

Petroleum imports

As predicted, the decline in posted world oil prices meant more in terms of stability for U.S. oil and natural gas prices than it did in additional domestic oil price reductions, which crept upward in 1983 in step with overall inflation. That oil as a political weapon has disappeared was confirmed in February by Energy Secretary Hodel.

The primary reason is the fundamental change in the world oil market since 1978, when imports from Arab members of the Organization of Petroleum Exporting Countries (OPEC) supplied 37% of all U.S. oil imports and 11% of total domestic consumption.

For comparison, the Arabs supplied 15% of all imports and 3.9% of domestic consumption in 1973 when their embargo brought on by U.S. support for Israel triggered long lines at gasoline pumps and fundamental changes in our attitude toward energy.

In 1983, imports into the U.S. from Arab OPEC countries, at an annual rate of 625,000 barrels/day, amounted to only 12.5% of all petroleum imports and 4% of domestic consumption.

Significantly, at no time during the crisis in Lebanon was there any mention of an oil embargo, or even a supply reduction by Arab countries. The present threat by Iran to close off the Strait of Hormuz, and so cut off most of the Arab oil supply from the rest of the world, is viewed as seriously by Iran's Arab neighbors as by the rest of the world because it would shut off the bulk of their income. It is, perhaps, the single biggest deterrent to such action.

That 4% dependency on Arab oil, about the same as in 1973, does not loom so large when it is considered that, in 1982, Mexico replaced Saudi Arabia as this country's largest single source of imported oil. In 1983, the U.S. imported about 822,000 barrels/day from Mexico and about 336,000 barrels/day from the Saudis.

Further, two major U.S. suppliers — Canada at 542,000 barrels/day in 1983 and the United Kingdom at 381,000 barrels/day last year — are not members of OPEC, which last year supplied only 36.7% of U.S. im-

TURN TO PAGE 143

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FROM PAGE 141

ports and 12% of consumption.

Any action by OPEC, especially the Arab members of OPEC, against the U.S. likely would cause more worry than harm because, in all probability, any shortfall in U.S. needs could be made up by non-OPEC suppliers and the strategic reserve.

Total petroleum imports into the United States in 1983 averaged 4.988 million barrels/day, down 2.4% from the average of 5.113 million barrels/day in 1982. The 1983 figure represents a 43.4% reduction from the peak import total of 8.807 million barrels/day recorded in 1977.

In 1977, OPEC nations supplied 70.3% of U.S. petroleum imports. By 1983, that share had shrunk to 36.7% and 63.3% of petroleum imports were supplied from non-OPEC sources.

"Although we may feel more confident about our energy future, we must not be complacent," advised Energy Secretary Hodel. "We are vulnerable to oil supply interruptions because of the tremendous potential impact on the world energy market and because of our international responsibilities."

Western Europe is 20% to 40% dependent on Persian Gulf oil, and Japan depends on that region for 54% of its needs. Also, there is a demand of the developing nations, which is expected to slow over the next decade but still increase faster than demand by the rest of the world. Too, about 40% of the world's proven oil reserves are in the Persian Gulf region, almost 25% (about 165 billion barrels) in Saudi Arabia alone.

Hodel said the 380-million barrel U.S. strategic petroleum reserve could tide the U.S. over for 1,000 days if Persian Gulf supplies were cut, 210 days if all OPEC supplies were stopped, and 90 days if all imports to the U.S. were cut off.

Coal

An improving economy, especially in the industrial sector, promises continued but moderate improvement for the nation's coal industry.

The National Coal Association (NCA) forecast that coal production in 1984 will increase by 29 million tons, or 3.7%, to a total of 817 million tons. The increase would mean a turnaround for the coal industry, where consumption dropped 4.25% last year from 823 million tons in 1982 to 788 million tons in 1983.

Unemployment in the coal fields continues significantly higher than the national average and companies are continuing to consolidate, NCA reported. Producing companies still are plagued by overcapacity, as high as 200 million tons, that can only be reduced by growth in demand.

Even though the cost of transporting coal to users, or to ports for export, continues to escalate faster than other costs, NCA reported several major companies reduced prices twice in 1983 in an attempt to retain foreign markets. Another major worry this year is the coming negotiations with the United Mine Workers, who represent 40% of the nation's mine workers.

Domestic coal consumption, at 721 million tons in 1983, was 2.4% above the 1982 total of 704 million tons. A similar 2.4% increase is expected in 1984 to 738 million tons.

Exports, on the other hand, declined by 28.5% in 1983, from 105 million tons in 1982 to 75 million tons last year. An increase of 5.3% to 79 million tons is expected in 1984, mainly because of an 11.1% increase in steam coal and a 4.8% increase in metallurgical coal.

Of the 1983 total production, 515 million tons or two thirds, was mined in the East and 265 million tons, or one third, was mined in the West. These shares are about the same as the 1982 experience.

Electric utilities, which consumed 85% of domestic coal consumption in 1983 and 77% of all coal mined in the U.S., are expected to increase their use of coal from 610 million tons in 1983 to 618 million tons this year, or 1.3%.

NCA forecasts a demand for 45 million tons of metallurgical coal in 1984, up 15.4% from 39 million tons in 1983, the lowest consumption figure for metallurgical coal in modern times, largely because raw steel capacity is expected to rise to 60%, or 90 million tons.

Continued strength in the industrial market is expected to boost the demand for coal from 72 million tons in 1983 to 75 million tons this year, or 4.2%. The increase in 1983 was 2.9% from 70 million tons in 1982.

Meanwhile, NCA has accused the Interstate Commerce Commission (ICC) of favoring railroads in the process of deregulating them and not protecting the interests of captive shippers as directed by Congress in the Staggers Rail Act.

As specific examples, NCA cited the action of Conrail to lower its coal rates only to have connecting rail carriers cancel through and joint rates in order to suppress competition. It also cited the CSX Corp. proposal to acquire American Commercial Barge Lines, the largest inland waterway carrier that carries about 56% coal tonnage. CSX owns two of the largest coal-hauling railroads, which handle 49% of all coal shipped east of the Mississippi. It says the ultimate effect of the merger would be to reduce coal's share of domestic and overseas markets.

On the longer term, NCA projected that U.S. coal consumption could grow to 1.128 billion tons a year by 1995, or 39% more than was consumed in 1982. This figure represents the middle ground between stagnation and revitalization scenarios. These other scenarios range from 1.012 billion tons to 1.235 billion tons.

Under the moderate growth scenario, total consumption would grow at an annual rate of 2.6%. Although significantly lower than NCA's last long-term forecast, it takes into account lower expectations for economic and energy growth, a restructuring of energy-intensive industries, greater fuel competition, and demographic changes.

All coal markets are expected to increase, including exports, which will be limited in the short term by sluggish demand and more competition. By 1995, NCA expects coal exports to reach 133 million tons, with 53% destined for use as boiler fuel compared to 38% today.

Each Statistical Panorama includes the latest data available. Sources frequently revise their previous year's figures, which explains apparent discrepancies between the latest and earlier published data. Where sources give significantly varying information, that data is mentioned.

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Spring: May, 1984
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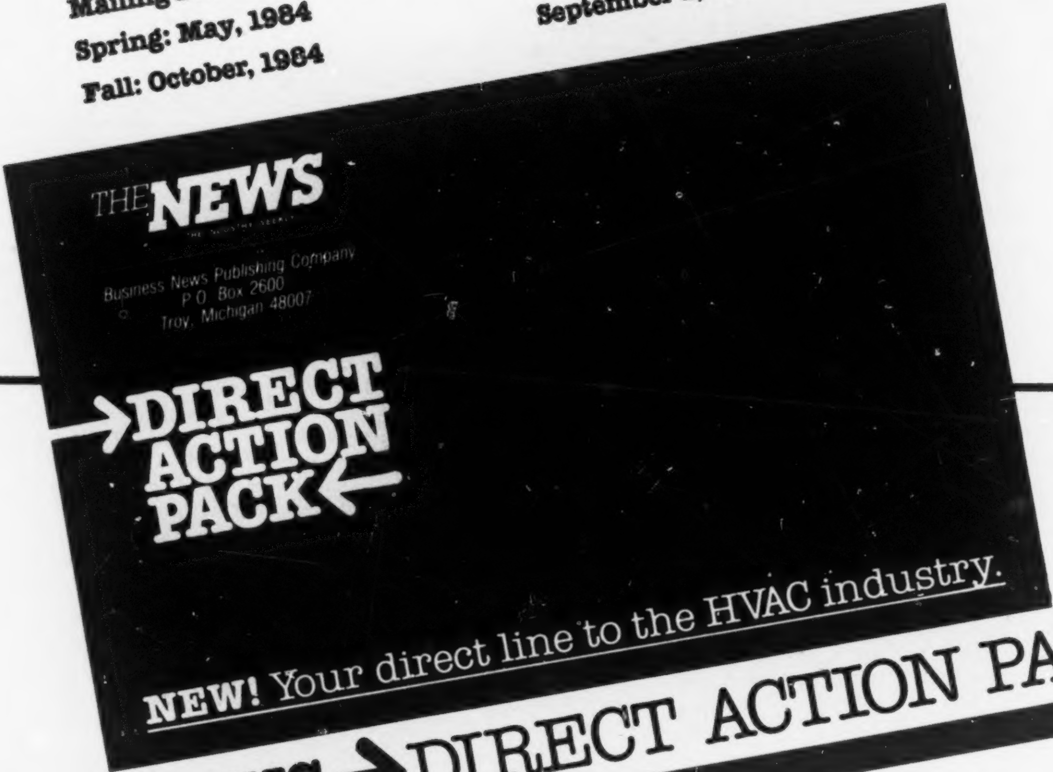
April 1, 1984
September 1, 1984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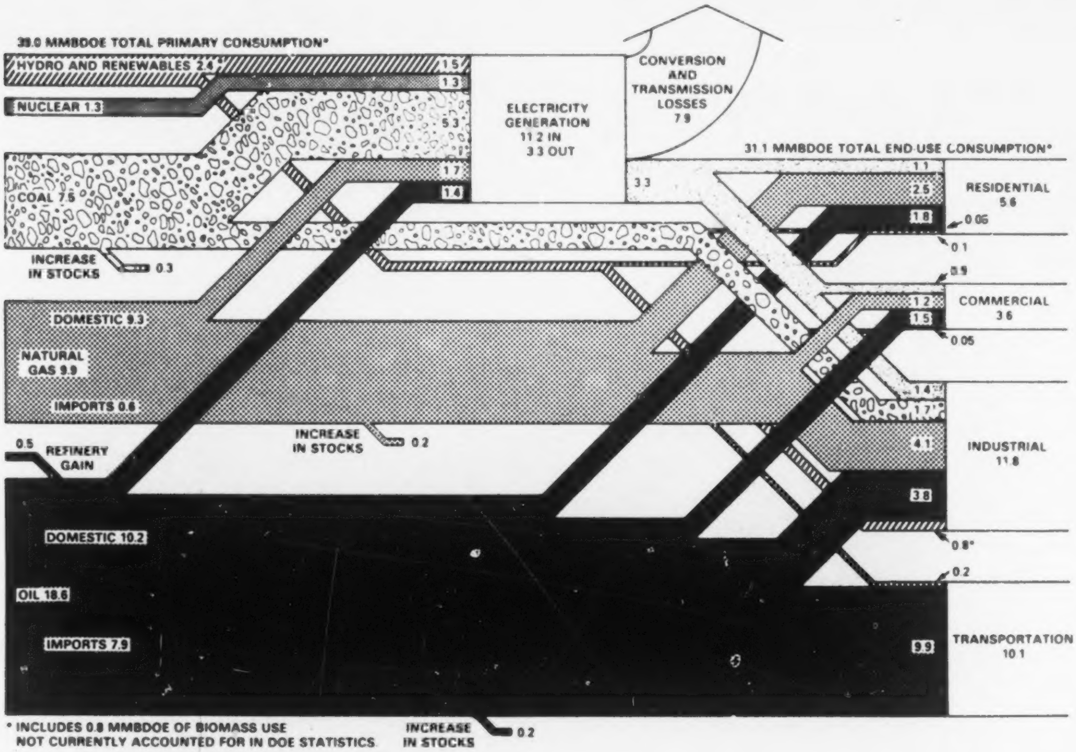

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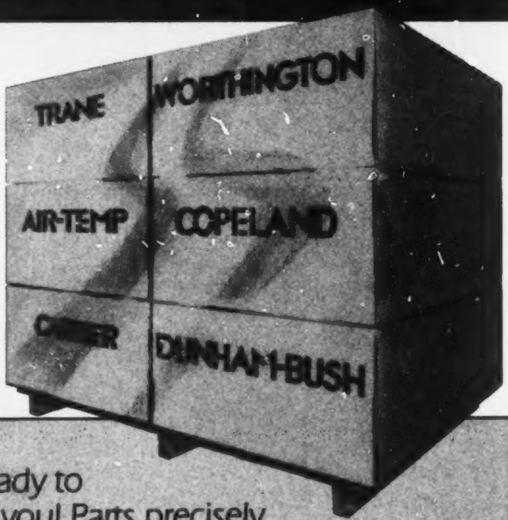

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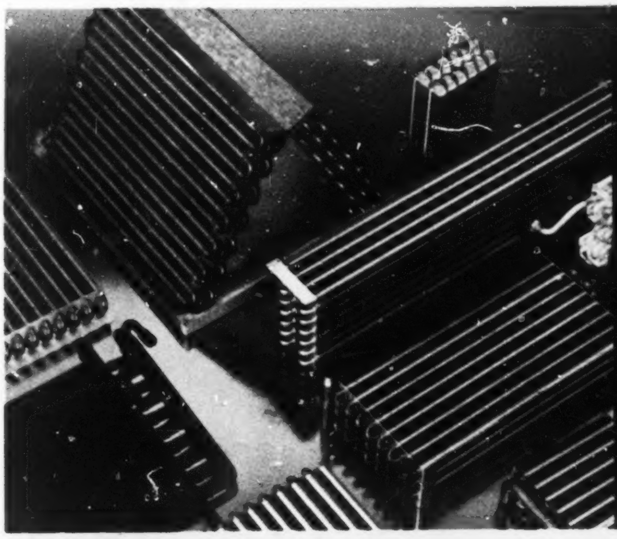

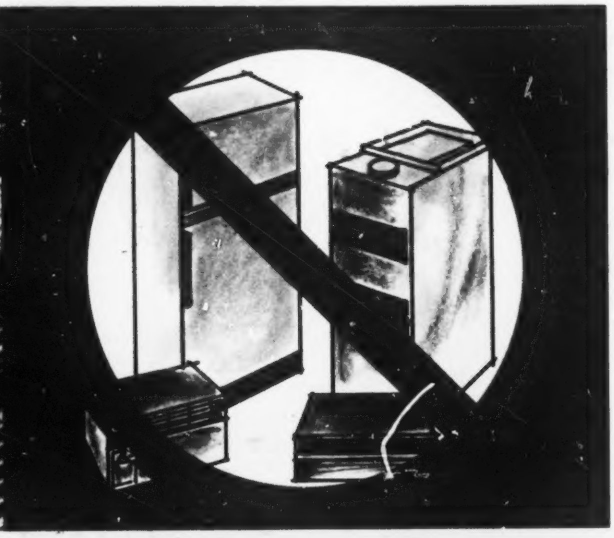

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